Industrial FINISHING

When
Mahon Engineers
. . . PLAN . . . BUILD . . . INSTALL . . .

COMPLETE *Finishing* EQUIPMENT

TO FIT *Your* EXACT REQUIREMENTS,

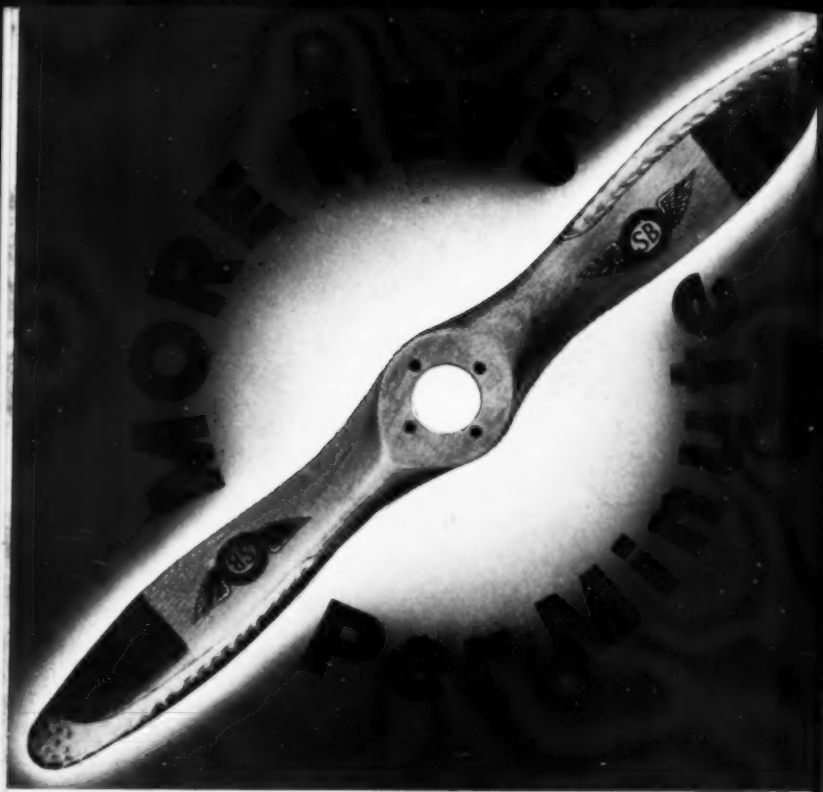
YOU SAVE BOTH HOURS AND DOLLARS

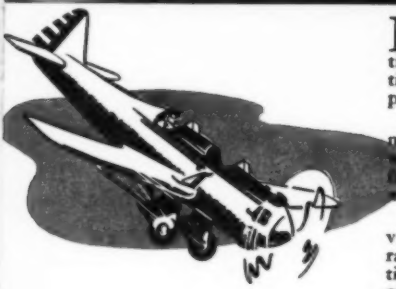
Replacing obsolete **Finishing Equipment** with modern machines and methods is mighty sound practice in meeting today's stepped-up production program. By relying on the practical experience and **Finishing** knowledge of Mahon engineers to plan, produce and install properly engineered, thoroughly coordinated Complete Finishing Systems, many alert manufacturers are realizing important savings in production hours and dollars. Consultation costs nothing—may result in valuable economies for YOU.

THE R. C. MAHON CO. • DETROIT • CHICAGO

Designers and Manufacturers of Complete Finishing Systems, Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of all Types, Filtered Air Supply Units, Hydro-Foam Dust Collectors and Many Other Units of Special Production Equipment.

MAHON





ROXALIN'S new Slipstream lacquer finish for wood propellers promises to replace conventional slow production materials and at the same time provide for greater efficiency and improved performance in modern light planes and trainers.

This new wood lacquer air dries in approximately 10% of the time required by conventional wood propeller coatings and, because it lowers friction over the blade, propeller efficiency is measurably increased.

Furthermore, its harder, more durable film provides greater resistance to abrasion from dust, hail, rain and snow, thus assuring more hours of flying time than it has been possible to expect from conventional materials.

ROXALIN FLEXIBLE LACQUER CO., INC.
Box 1121 • Elizabeth, New Jersey

ROXALIN *Flexible* FINISHES

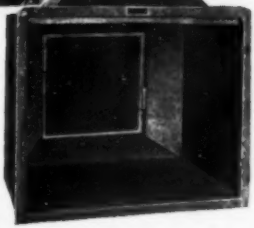
WHERE THE FINEST FINISHES ARE USED ROXALINS

AAF *Sinuous* FILTERS

cut original cost and maintenance

Worthwhile initial savings in addition to maintenance savings are made possible by the use of American Sinuous Filters in spray booths to take the place of standard ventilating units equipped with special louvers. Serious maintenance problems are eliminated by the removal of spray vapor before it reaches fan and ducts, prevents accumulation on fan blades and reduces fire hazard. Write for Bulletin No. 224 which gives complete information data.

AMERICAN AIR FILTER CO., INC.
Incorporated
250 Central Avenue
LOUISVILLE, KENTUCKY



SINUOUS SPRAY BOOTH FILTER

Consists of cell and frame permanently fastened to sheet metal partition at back of booth. Cells are held in place by spring latches. Each cell has a capacity of 1500 c.f.m.

AIRMAT DRY FILTER

For use in smaller drying rooms where drying time can be materially lessened by bringing filtered warm air in contact with finished surfaces and exhausting the fume laden air. Bulletin No. 250B.

AMERICAN AUTOMATIC FILTERS FOR FINISH DRYING

Used for larger drying room ventilation to protect finish and accelerate drying. Bulletin No. 240C.

AMERICAN AIR FILTERS

FOR PROTECTING PRODUCT FINISHING

ZAPONOL'S controlled penetration does it!

This panel from the plant of Oxford Furniture Co. at Oxford, Pa., is concrete evidence of the uniformity that's obtained on mixed, porous or streaked woods with Zaponol wood stain.

The secret is Controlled Penetration which is unique with Zaponol and is due to a specially developed resin base. Through Controlled Penetration wood is thoroughly and uniformly stained but excessive penetration is avoided. Remarkable clarity of grain is secured.

Money saving is also a vital factor because better finishes are obtained with fewer coats and there's no wash coat—all mighty important today. Ask for the folder on Zaponol—with actual wood panels.

Zaponol—Reg. U. S. Pat. Off.

ZAPON

ZAPON DIVISION · ATLAS POWDER COMPANY

Eastern Sales: Stamford, Conn. Western Sales: North Chicago, Ill.

INDUSTRIAL FINISHES

EIGHTEENTH YEAR OF PUBLICATION

Industrial FINISHING

Reg. U. S. Pat. Office

Published Monthly in the Interest of Modern Production Finishing

Vol. XVIII, No. 2 | DECEMBER, 1941 | $2.00 a Year

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Owned and Published by
Practical Publications, Inc., 1142 North Meridian Street, Indianapolis, Ind.

Eastern Representative: C. A. Larson, 254 West 31st Street, New York City; Phone Penna. 6-9049

Letters from Readers...

OF INDUSTRIAL FINISHING

These letters (and many others) were answered recently by the editorial department, but are published here to reveal certain interesting trends of desire and activity in the industry, and to encourage additional inquiries, comments and suggestions. Further information about any of them can be obtained by writing this office.—Editor.

Acid-Resisting Air-Dry Varnish

We are interested in an air-drying varnish that has good acid and alkali resisting qualities, as well as satisfactory mechanical characteristics, together, with a tough surface. We would appreciate it very much if you could let us have the names of some manufacturers of this type of material.—A. Z. Laboratories.

Heat Resisting Paints

Having read, in an outside copy of INDUSTRIAL FINISHING, an article entitled "Heat Resisting Paints", we are very much interested in same and would appreciate it if you would kindly send us a copy.—N. H. A. (Chemical Laboratories).

We understand that an article called "Heat Resisting Paints" appeared in the April 1941 issue of your publication. This subject is of interest to us in connection with our work in reporting on consumers' goods, and we would appreciate it if you would send us a copy of the article in question, for our files.—Consumers' Research, Inc.

Centrifugal or Tumble Finishing

Kindly advise if small wood parts (such as handles, etc., which are irregular in shape) can be finished satisfactorily by centrifugal motion or by the tumbling barrel method. We anticipate a large volume of this type of work and must adopt the most economical method. The writer might mention that these parts must first receive a coat of lacquer stain followed by a coat of varnish.—K. W. J. Co. (Furniture Mfrs.)

Yes, those wood parts can probably be satisfactorily coated either by centrifugal machine or by tumbling. We are writing you and submitting names and addresses of manufacturers of the equipment.—Ed.

Tumble Finishes

We have a customer who is interested in tumble finishes and we have sent him the September and October issues of INDUSTRIAL FINISHING with the article in there on "Tumble Finishes". If you have any other information available on the subject, we would appreciate getting it.

We would also like to know the names of manufacturers of tumbling equipment, if you have this information available.—S. Paint & Varnish Co.

Information supplied.—Ed.

Reproducing Wood Grain on Steel

Will you be kind enough to advise us the names of different manufacturers from whom we can get literature and information regarding reproducing wood finishes on steel? At present time we are sending our work out.

SURFACE—SERVICE

NOW THAT our products are known as "Protective Surface Coatings," we suggest new finishes which conserve—yet enhance the beauty of your finished surface, and prolong the life of your furniture.

Many new and unusual finishes for the coming markets are already in work in our Finish Studios.

By appointment, you may ship your new numbers to our Laboratories for complete finish in our latest color creations and unusual finishes.

Your finished samples will be delivered direct to your space at the Marts if desired. May we serve you?

V. J. DOLAN & COMPANY, INC.

Mnfrs. of "Unquestionable Quality" Industrial Finishes

1830 N. LARAMIE AVE. CHICAGO, ILLINOIS

We are a small concern and about the largest surface we have to be finished would be approximately 14-in. wide by 84-in. long. These are maximum. The majority are up to 10-in. by 65-in. — L. M. Co. (Fluorescent Lighting Fixtures).

Coating Prevents Sweating Pipes

We notice in INDUSTRIAL FINISHING for September 1941, page 62, you mention a coating of "Insulmat" for application on sweating pipes. We would like further information concerning this material as to size of shipping containers, price, etc., and of course who makes the material.—F. G. B. (Rubber Goods).

Information supplied.—ED.

Striping Tools

We are interested in obtaining all the information we can in reference to striping pencils for fancy use. Please send us your latest catalog, with price list and descriptive information on all the different sizes and kinds of these pencils which you are in position to furnish at this time.

There is a hurry on this for an item which we are developing for immediate manufacture and your prompt attention will be appreciated.—C. Mfg. Co. (Belts, Jewelry).

We presume that you have in mind small striping tools, not brushes, and we are submitting names of such manufacturers.—ED.

Can Furnish Plastic Moldings

On page 4 of the October issue we notice an inquiry relative to plastic molding for table edges. We have, for the past few months, been supplying several local table manufacturers with a plastic table edging in "T" shape, in ivory and black, to replace the metal moldings formerly used.

This plastic molding has proved so satisfactory that one manufacturer has disposed of the balance of aluminum molding he had on hand, as well as the stainless steel. Much time is saved in the application of the plastic molding. It never loses its color or luster, and the trade here like it better than metal moldings. If you will

advise your inquirer of our address we will be glad to go into the matter with him.—Plastic Process Co., Hollywood, Calif.

I. F. Articles in Demand

We clipped so much material from your October issue that we are unable to supply one of our clients with an important item on page 69. If you could send us this page from one of your cut copies we would appreciate it very much.—R. H. B. & Co. (Surveys and Reports).

I would appreciate receiving copies of the articles entitled "Substitution Finishes We May Turn To" and "Variety of Finishes to Replace Aluminum". These abstracts appear in the Abstract Review No. 68, date September-October 1941, published by the National Paint, Varnish & Lacquer Association, Inc. Your prompt attention in this matter will be appreciated. —E. B. (Chemist in Paint Division).

We are sending you tear sheets of the articles you requested. These articles appeared in June and July 1941 issues and we are surprised that you did not see them then. You or your company should be getting INDUSTRIAL FINISHING regularly. Every issue contains many new and original articles of great interest and informative value to everyone in the industry, including paint chemists. We urge you to have your company subscribe for a copy of the magazine to be sent directly to you. Then you will have an opportunity to read articles of the kind we are sending you and will not have to wait four or five months to obtain the information.—ED.

Wax for Finished Parts

We noticed an article in October INDUSTRIAL FINISHING, page 64, regarding Hydrowax for use on Jetal finished parts. Will you please advise us of the manufacturer or distributor for this article in which we are interested?—R. Mfg. Co.

Information furnished.—ED.

Finger Prints on Metal

An article entitled, "Harmful Finger Prints on Metal to be Finished," written by Louis Nagel, appeared in the December 1937 issue (pages 62-63) of your magazine. We would like to ob-

Priority Orders . . .

UNITED'S DEFENDER LINE

Defense products often require specially formulated protective coatings to meet the exacting conditions of wear, tear and abuse which they will receive in actual use. United's chemists have developed the DEFENDER LINE of protective coatings to meet the extraordinary specifications and requirements of defense products. If you have a production finishing problem on priority rated products you will find a quick solution among UNITED'S DEFENDER Line of protective coatings.

Send us your specifications and requirements—working samples and complete information will be sent promptly.

LACQUERS
THINNERS
ENAMELS
METALIZED FINISHES
SYNTHETICS

UNITED LACQUER MFG. CORP.
General Offices and Factory: Linden, New Jersey
New England Mfg. Division: Boston, Mass.

tain a copy of the article and would appreciate your sending us either tear sheets of the article or a complete magazine. You may bill us for the cost.—A. F. Co.

Tobacco Cloth

We recall seeing, at various times articles in INDUSTRIAL FINISHING regarding the use of tobacco cloth for wiping purposes in finishing departments. We are interested in such material and we would appreciate it if you will advise us where we can purchase tobacco cloth or any other economical lint-free wiping cloth.—E. B. Co. (Enameled Kitchen Ware).

Information furnished.—ED.

Electric Rubbing Machine

Will you please furnish us with name of a manufacturer who makes small rubbing machines run by electricity? We manufacture tables, and the heavy air-driven or the 7 to 10-lb. air-driven machine is too hard on the structure of the tables.—X. Furn. Co.

What you are looking for is advertised on the front cover of Oct. 1941 issue of INDUSTRIAL FINISHING Magazine.—ED.

Rust Remover

We would appreciate it greatly if you, or some of your readers, could tell us where we might obtain a rust remover that could be applied by cloth or brush. It seems to us that, at some time or other, we have seen a product such as this on the market.—K. E. Co. (Cameras).

Information given by letter.—ED.

Automatic Lacquering of Small Articles

(Via Clipper Airmail)

We are interested in the installation of an automatic machine for lacquering small articles, such as hairbrush backs, nailbrush backs, toys, etc.

To the best of our knowledge, there is no such equipment in New Zealand, and although one or two industrial finishing firms are represented in the Dominion, inquiries have resulted in reports that automatic systems are a highly specialized branch of engineer-

NOW IS THE TIME

for all purchasing agents to come to the aid of their companies. There is no time for mistakes on Defense Orders, or rejects due to faulty finishing materials.

For economy and finishing speed, specify SEA-LAC Primers, Lacquer Enamels, Synthetics, made to meet rigid government specifications.

Pints or carloads, there is no variation in quality or service. SEA-LAC Defense Orders are shipped on time . . . pass finishing tests every time.

Write now for quotations and full information.

You, too, may enjoy smooth sailing with—

SEA-LAC

Duralac Chemical Corp.

84 Lister Ave. Newark, N. J.

Merry Christmas

Happy New Year

For a prosperous year in 1942 try decorating with

CLAREMONT FLOCKS

COTTON—WOOL—RAYON

Others have been doing it for years and found a new source of increased sales **and** profits.

Write for Color Card and Samples.

CLAREMONT WASTE MFG. CO.

CLAREMONT, N. H.

The country's leading makers of Cotton, Wool and Rayon Flocks

ing, and at the moment they do not stock this type of equipment.

Our firm is a selling organization with six New Zealand factories, in addition to import trade. One of these associated companies is about to build new premises, in which they are hoping to house two or three of the aforementioned manufacturing concerns.

Two of these manufacturing companies produce, or use in their manufacture, quantities of small wooden articles which require a lacquer finish. One of them manufactures toilet brushware, and the other manufactures golf clubs, small wooden toys, small household fittings, display cases for factory products, etc.

About the smallest article handled would be a nailbrush back, sample of which is being sent under separate cover by surface mail, and the largest article would be a display case for holding toothbrushes, measurement say 15x12x12-in.

Production Quantities: For such articles as show cases, maximum runs would be about 500 articles; individual lines of toys, 5 to 10 gross of a specific toy; nailbrush backs, 100 gross of a pattern.

This, we hope will give you an idea of the quantities of an article put through in a single run, but it does not include color changes. For example, with nailbrush backs, a 100-gross run would be divided into say three different colors, while other articles may be reduced to as low as one gross of articles of a color at a time.

Now, while individual runs may not be so large, annual production would be, for the size of our country, very considerable. For instance, a conservative estimate of what we are producing at the present moment would be, per year:

Nailbrush backs, about 500 to 750 gross.

Hairbrush backs, about 500 gross—soon, we hope, up to 1000 gross.

Toys upward of 500 to 1000 gross. These vary from little wooden motor cars about 3 or 4-in. long, to wooden battleships about 14-in. long.

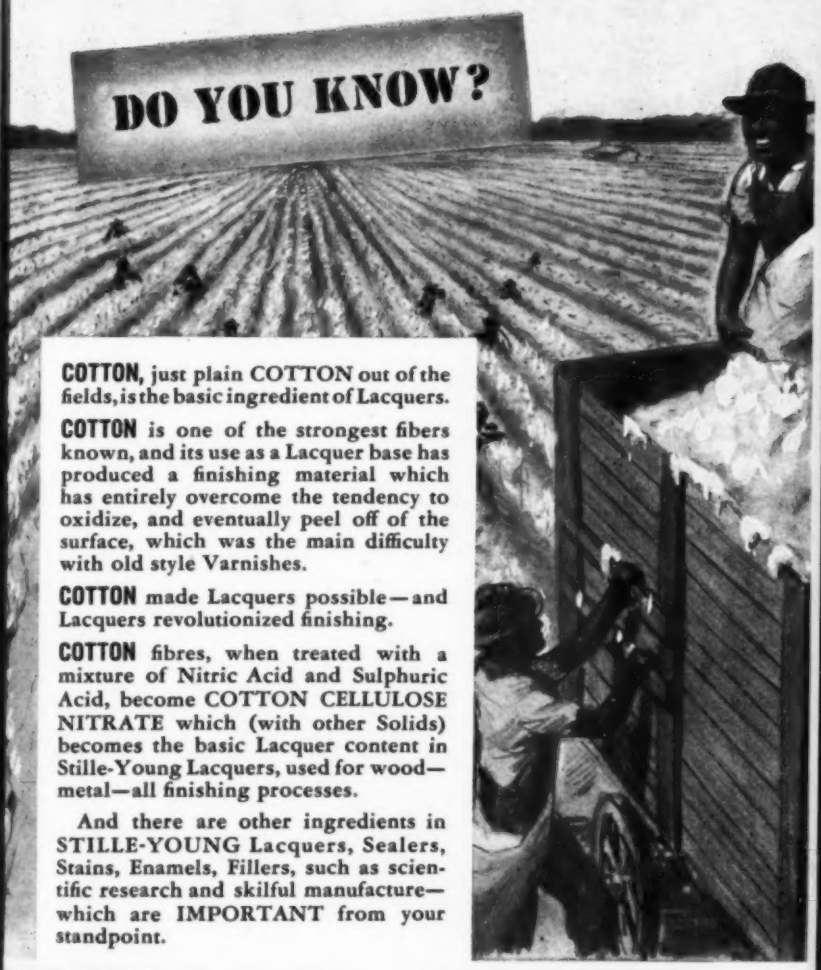
Now while this total would mean approximately 300,000 articles handled per annum, the introduction of automatic equipment should make possible the handling of many more articles.

Laquers available in this Dominion are not very great in variety. Undoubtedly, the most reliable are those products of Messrs. British Australian Lead Manufacturers (N. Z.) Ltd., which is an Associate Company of du Pont de Nemours, and at the moment most of the lacquer used by us on wooden articles is their No. 508 Industrial spraying Lacquer.

Humidity conditions in this town are, from a finishing point of view, bad. We are right at the water's edge and we have an annual rainfall of

(Continued on page 75)

OTTON–and STILLE-YOUNG Lacquers



COTTON, just plain COTTON out of the fields, is the basic ingredient of Lacquers.

COTTON is one of the strongest fibers known, and its use as a Lacquer base has produced a finishing material which has entirely overcome the tendency to oxidize, and eventually peel off of the surface, which was the main difficulty with old style Varnishes.

COTTON made Lacquers possible—and Lacquers revolutionized finishing.

COTTON fibres, when treated with a mixture of Nitric Acid and Sulphuric Acid, become COTTON CELLULOSE NITRATE which (with other Solids) becomes the basic Lacquer content in Stille-Young Lacquers, used for wood—metal—all finishing processes.

And there are other ingredients in STILLE-YOUNG Lacquers, Sealers, Stains, Enamels, Fillers, such as scientific research and skilful manufacture—which are IMPORTANT from your standpoint.

STILLE-YOUNG

LACQUERS · SEALERS · STAINS · ENAMELS · FILLERS

MANUFACTURERS . . . CHICAGO, ILLINOIS

THE LILLY COMPANY

HIGH POINT, N. C.

THEY PROTECT!

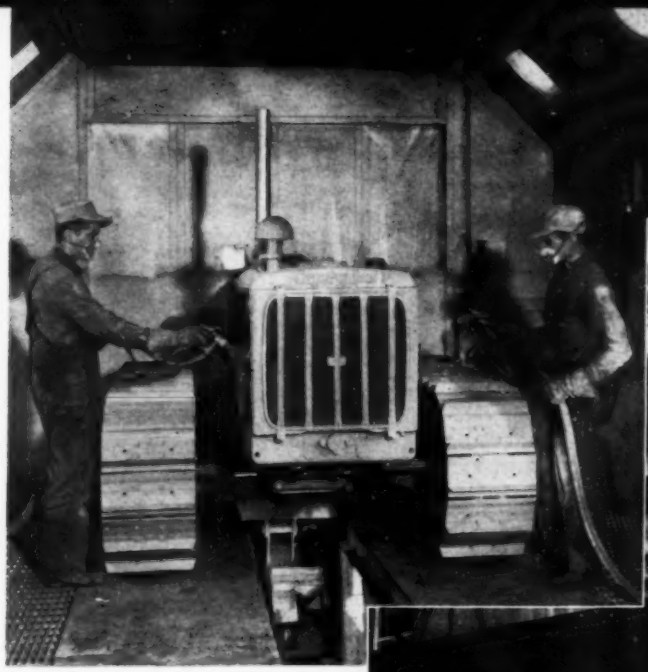
And so it is with organic finishing materials . . . they enhance appearance but they also protect. Unlike madam's furs, however, which offer protection only in cold blustery weather, organic finishes afford protection the year round, summer and winter, against all the elements of destruction. They protect metal against rust and corrosion; wood against moisture and warping.

At the present time three Lilly research units, advantageously located*, are busy developing Protective Coatings to meet present day emergencies. Through knowledge gained from years of experience in making **specific** finishes for **specific** products and purposes, these units are able to cope with and overcome, present difficulties of raw material shortages due to Defense Work, which must be served first.

LILLY VARNISH COMPANY

INDIANAPOLIS, IND.

*INDIANAPOLIS, IND. *HIGH POINT, N. C. *GARDNER, MASS.



Illustrations show inside and outside views of water-wash spray booths in which tractors are spray painted. Notice sliding doors to booths, three pipe lines for paint, intake and exhaust pipes. Photographs, courtesy of Caterpillar Tractor Co.

Describing certain equipment and methods used for cleaning the metal surfaces of Caterpillar tractors, and applying protective coatings and identifying colors thereon — as now employed at the company's factory in Peoria, Illinois.

Cleaning and Painting Caterpillar Tractors

BY F. A. WESTBROOK, M. E.

WHEN Caterpillar tractors are delivered to their users they present an attractive appearance, which is in keeping with their excellent reputation for service. The various operations by means of which this finish is produced are quite complete and effective—and of decided practical interest to equipment manufacturers who have to meet more or less similar conditions, in whole or in part.

After being assembled the tractors are driven (under their own power) into steam booths where they are coupled up by a drawbar to a hitch mounted on the floor. This hitch can be raised above the floor level. The first operation consists of steaming the tractors all over, including the under side, with a solution of tri-sodium phosphate and then rinsing with hot water. They are then driven out of the steam booth, after which the excess water is blown off with compressed air. This is followed by a washing of all sheet metal parts with a

metal cleaning compound to remove all traces of oil, and rust.

The next step consists of applying masking tape over several small areas such as the serial number plates, gauges, spark plugs, wires, lights and all other parts that are to be shielded from paint. Before painting it is sometimes necessary to sand some rough places. For this purpose No. 80 emery or No. 7/0 garnet abrasive paper is used. After this the tractors are ready to be painted.

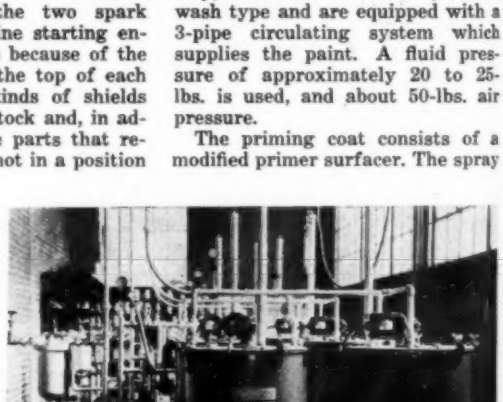
The spray operators explain that formerly they used permanent, removable, masking shields but found them impracticable for this particular line of work. The shields did not fit closely enough in some instances to maintain the company's high standard for clean-cut jobs. For instance, it was awkward to use shield over the two spark plugs on the gasoline starting engines of the diesels because of the rubber cover over the top of each plug. Too many kinds of shields had to be kept in stock and, in addition, many of the parts that require masking are not in a position where shields are effective. Also, due to the nature of the products it is not practical to use shields that are connected.

Masking tape has been found to be the fastest and most economical for this work. Long strips of tape are placed in a stack and quickly cut with dies. Cutting layouts are so made that there is a minimum of waste. Scraps of masking tape are used for control knobs and similar small items.

Men who remove the masking tape salvage the usable pieces. It is often possible to use these pieces two or three times before they become heavily loaded with paint or their adhesive surfaces become ineffective.

The tractors are driven into the spray booths. These booths, by the way, are of the down-draft, water-wash type and are equipped with a 3-pipe circulating system which supplies the paint. A fluid pressure of approximately 20 to 25-lbs. is used, and about 50-lbs. air pressure.

The priming coat consists of a modified primer surfacer. The spray



Here are the mixing tanks and circulating pumps for the paint-circulating system that supplies water-wash spray booths in the Caterpillar Tractor factory.

men start to re-coat immediately with synthetic enamel, beginning on that part of the tractor which was the first to receive the priming coat. This permits of a drying time, for the priming coat, of from 15 to 45 minutes, depending on the size of the tractor, number of special attachments, etc. In any event the time is sufficient for adequate drying.

Drying time for the finish coat of paint varies somewhat according to atmospheric conditions, but normally a tractor is ready to ship three hours after being painted. Tractors are driven from the paint booths into the finishing room as soon as the enamel has been applied. Transfers are applied in the finishing room while the paint is still tacky, which obviates the necessity of using transfer cement. Here, also, the tractors' exhaust stacks and exhaust manifolds are given a coating of aluminum paint. Masking tape is removed and raised letters, radiator bars and grills are blacked.

It is interesting to note that the master air gauges insure a constant pressure, which makes it easier to apply a uniform coating of paint. If the material and pressure were not regulated in this way it would be impossible to get a uniform coating applied under identical pressure in every booth, as individual workers have their own theories and preferences along these lines.

Three pipe lines serve each spray booth, carrying the standard yellow primer and enamel from the paint-circulating room. These lines are on each side of the booths so that two men can spray the same material at the same time on opposite sides of the tractor, as shown in the illustration at the beginning of this article. One pipe line carries the primer and another line carries enamel. The third line also carries enamel which is used for painting the tracks on the tractors; these are painted while in motion. For this work more fluid pressure is used, as well as a larger tip and needle in the spray gun, so that the track can be painted rapidly.

Of course, tractors can be painted in any color or in as many colors as the customer desires. However, special colors are sprayed from pressure tanks instead of from the continuous circulating system. It requires approximately 100 gallons of paint to fill the circulating lines and in many cases a special color job does not require this amount.

Conditions We Face

THE PAINT companies are not going out of business, even if war is declared, and I am almost sure that they are not going to have to discontinue making lacquers indefinitely. However, the supply will be limited and rationed out. No one will be able to give a sure date when shipment will be made.

It is not the desire of our government to force anyone out of business. Eventually the priority group will be functioning so that everyone will get their share of raw material, but it will take time. Also, I believe that manufacturers of solvents will be able, sometime early in 1942, to ship in carload lots again, as they are rapidly expanding their plants. The new equipment to be installed will be able to produce more than the government needs.—RUSSELL DAVIS.

Accurate Cost Control in th

ST-1

NAME JOHN ULLMAN CLOCK NO. 1410

DATE	STD. HRS.	BON. HRS	TOTAL HRS.
10-30-41			

EFF.	RATE	BONUS	DAYWORK	PAY

ORDER NO. J-1848-7 OFF 11 00
ARTICLE B.P. UNITS ON 7 00
OPERATION 2-1 SPRAY STD. EFF.
QUAN. 25 CLOCK NO. 1410 TIME PAY
DEPT. 29 10G. #89

ORDER NO. B22697 OFF 14 00
ARTICLE SHELVES ON 11 00
OPERATION 1ST SPRAY STD. EFF.
QUAN. 125 CLOCK NO. 1410 TIME PAY
DEPT. 29 12G #1015

ORDER NO. L 44401 OFF 17 00
ARTICLE UPRIGHTS ON 14 00
OPERATION 2ND SPRAY STD. EFF.
QUAN. 700 CLOCK NO. 1410 TIME PAY
DEPT. 29 16G #1005

ORDER NO.
ARTICLE
OPERATION
QUAN. CLOCK NO.
DEPT.

SS-17 ORDER NUMBER J-1848-7 ARTICLE NAME #1848 BLUEPRINT UNIT
ARTICLE NUMBER #1848
DATE ISSUED 10-1-41 QUANTITY 500 BLUEPRINTS BP 001848

MATERIAL DESCRIPTION	LBS.	OZS.	GALS.	PRICE	AMOUNT	DATE	CLOCK NO.
#89 OLIVE GREEN			10.0			10-30-41	14
" "			18.0			10-31-41	14
" "			7.5			11-4-41	14

IT IS JUST "good business" to set up cost control methods in the finishing room. Today, more than ever, consumers of finishing materials are required to maintain control as a result of raw material shortages and priorities.

So-called "systems" are often termed elaborate and costly, but such terms, when applied to a system are usually found to be nothing more than pet peeves of a very few people rather than fact. A company spending $150,000 for finishing materials in a normal year cannot afford to be without such a system.

In a job finishing department, where more than 100 different materials are handled and several hundred different items are finished in quantities from one to 10,000, the system of control must be flexible in order to be of practical value, as well as economical.

Fig. 1 (Left)—The original (3½x9½-in.) is on thin white paper; under it is a sheet of carbon paper and under that is a cream-colored card printed exactly like the original. All are lightly fastened at the top.

in the Finishing Room

BY NORBERT F. SCHROEDER
Hamilton Manufacturing Company

A system for this type of finishing room begins to function immediately at the source of consumption—the finishing operation. The sprayman fills out a daily job time ticket, Fig. 1, upon which he enters the order number, article, operation, quantity, department, and quantity of material used in that operation.

In a job finishing department where siphon cups, gravity buckets and pressure tanks are used in finishing, scales, charts and tables are worked up for each. The operator merely checks the material when starting in the morning and checks after each completed operation. One operator might work on as many as ten jobs each day and handle three or four different finishing materials. However, the foreman always attempts to plan the work far in advance, so as to keep one operator on a minimum change of color, thereby eliminating clean-up time, etc.

The daily job time ticket, made out in duplicate, is left with the foreman each night. The following morning the department clerk posts the necessary information from form ST-1 onto the material card, Fig. 2. The material card is sent to the finishing room with the order and the top half is a duplicate of the top half of the order, both run off on a duplicating machine. The clerk enters the type of material, quantity used, date, operator's number, and units completed.

Standards are pre-determined for each article and actual performance is checked against the standard. If the performance is satisfactory the first day, that item is not checked against the standard for the remainder of the order, because the first day's posting serves as standard. It will be noted that the clerk can determine at a glance on the following days whether or not performance is within standard.

This method enables the clerk to check either the same operator's performance or one operator against the other on consecutive days. If any discrepancies arise they can be investigated immediately, the following morning, when the operation is still fresh in the minds of the operator and foreman. If error is committed in cal-

FINISHING MATERIALS			
DETAILED BY N.S.		NO. OF COPIES 5	
STEEL DETAILS 5	LUMBER REQ'M.	MOVE TICKETS 14	
1ST SPRAY	2ND SPRAY		
	25		
	45		
	19		

Fig. 2—This yellow card, 8 x 4½-in., is ruled and printed on the back, but the back has only part of the printing shown on this side—the face side—the line above the double rule.

culation, it can be readily located by checking the materials remaining at the work station.

How Filled-in Cards Are Used

Each job in the factory has a materials card and is kept on file until that order is completed. The materials card is then sent to the cost-accounting department where prices are entered and total finishing costs are compiled and filed in a folder set up for that particular order.

The daily job time-ticket is sent to the payroll department where wages are computed. The duplicate copy remains in payroll files and the original is separated along the perforated lines and filed in the cost job folder. The individual slips remain with the folder where labor costs are compiled and posted.

These two forms, therefore, serve four purposes, namely, material control on the job, payroll, labor costs, and materials costs for accounting.

In a production finishing department where not more than three materials are handled and unit output is more or less standard, a somewhat different system can be applied. Because of the volume of material sprayed one is interested in more than merely total consumption. Also, because units vary in shape and size but finish and total film thickness are rigidly standardized, a more detailed control must be practiced.

A More Detailed Analysis of Performance

In this department where eight spraymen handle the same primer

PRODUCTION FINISHING REPORT

PRIMER DATE 10-25-41

UNITS	SQ. FOOTAGE SPRAYED	% REJECTS	MATERIAL USED	COVERAGE PER GAL.	COST PER SQ. FT.	LABOR SQ. FT.	CHAIN SPEED	OVEN TIME
500	50000	2%	83.5 Gal.	600 Sq.Ft.	.00375	.00150	7Ft.	9.0

Unit Cost

Matr'l $.380

Labor $.150

ENAMEL

UNITS	SQ. FOOTAGE SPRAYED	% REJECTS	MATERIAL USED	COVERAGE PER GAL.	COST PER SQ. FT.	LABOR SQ. FT.	CHAIN SPEED	OVEN TIME
500	40000	3%	134 Gal.	300 Sq.Ft.	.01090	.00212	7Ft.	9.0

Unit Cost

Matr'l $.870

Labor $.170

Fig. 3—Both of these two forms are printed on one side of a single sheet 8½x11-in.

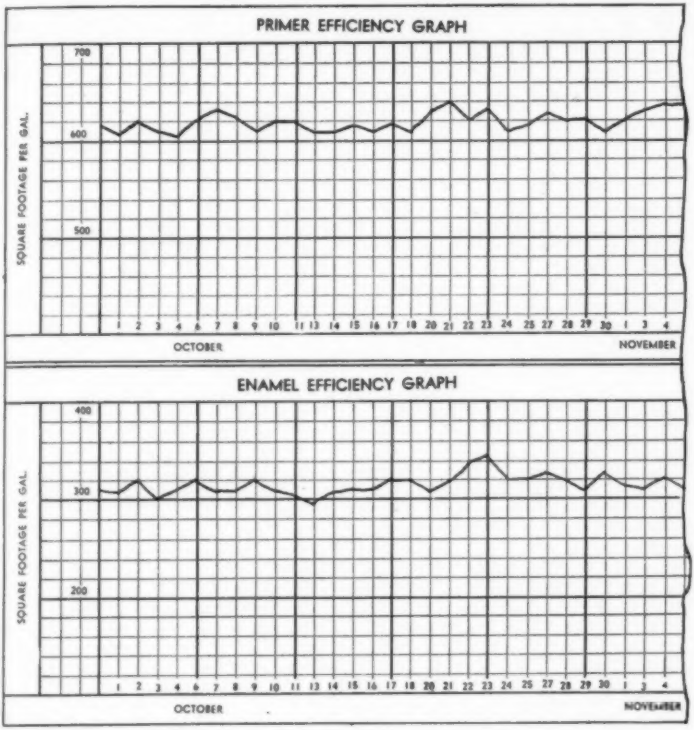


Fig. 4—Both graphs are on a single sheet of regular graph paper and marked in pencil.

and enamel for days at a time, we must break down their performance into a more detailed picture as shown in Fig. 3.

Each day's production, in number of units, is entered on the Production Finishing report, along with the total square footage sprayed. The amount of material used, obtained by checking circulating tanks in the paint-mixing room, is also posted. Of course, from this information one obtains the square footage per gallon or efficiency of material sprayed. The efficiency, coverage per gallon, must be maintained and is compared with the pre-determined standard for each material. The remainder of the report is then computed to show cost per square foot, labor per square foot, chain speed, oven time, and material and labor unit cost.

One copy remains with the foreman and another routed copy is sent to the superintendent, then to the works manager, and then to

the research laboratory where it is filed for reference and estimating purposes.

The Efficiency Graph

The performance or efficiency is posted each day, for both materials, on the Efficiency Graph, Fig. 4. This graph serves several purposes. It enables the foreman to see at a glance just how his operators are performing. It enables him to give a superior executive any desirable information regarding the material, unit cost and crew efficiency without having to refer to reports filed in the past.

The greatest dividend realized by use of the Efficiency Graph is the psychological effect it has on the spraymen. Every operator is interested in the performance of his division. And since the graph is posted within easy reach of every operator and both performance curves appear on the same graph, it arouses a competitive spirit among the operators to out-perform the other group.

Experience has proved that this competitive spirit brings forth many suggestions for improvements in material conservation. The men become whole-heartedly interested in their work and it tends greatly toward breaking the work monotony. The fact that this graph is within view of operators, foremen, executives and visitors, just keeps every man "on his toes", be-

The maker calls it "Lancelata," which is the botanical name for ash, and combines it with leather to make this striking bedroom group, which appeared at the fall national home furnishing market at the American Furniture Mart. The wood is highly grained and finished in a harvest tone. With leather taking the place of hardware for pulls on the chest and night stand, there is no need to fear priority shortages. The headboard is also covered with leather. Photograph, courtesy of American Furniture Mart, Chicago.

cause he knows that anyone man letting down will reflect on his entire division.

Of course, it must be borne in mind that attaining and maintaining this kind of standard performance must include ideal working conditions, best available equipment, carefully checked fluid pressures and air pressures, regular checks of film thickness, etc., which will be discussed in a later issue.

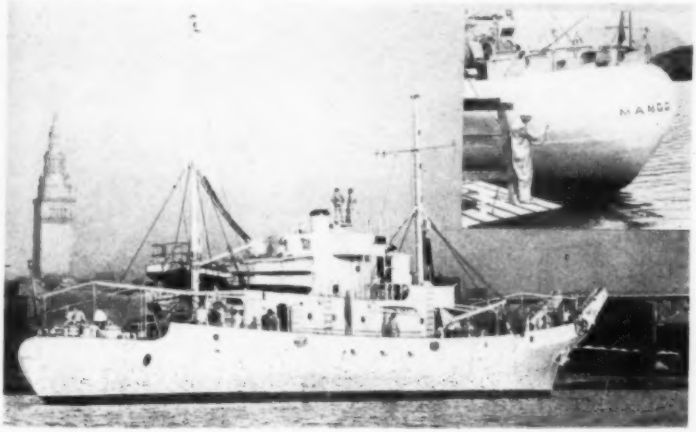
Painting Ships by Spray System

SPRAY PAINTING equipment is playing an important role in the building of America's great new 2-ocean navy. In shipyards throughout the country, spray painting speeds the production of everything from dreadnaughts to dinghies. For instance, the Cleveland and Lorain, Ohio, yards of American Shipbuilding Co. are busy turning out Class Y N Net Tenders, the ships that lay great meshes of cables to trap submarines.

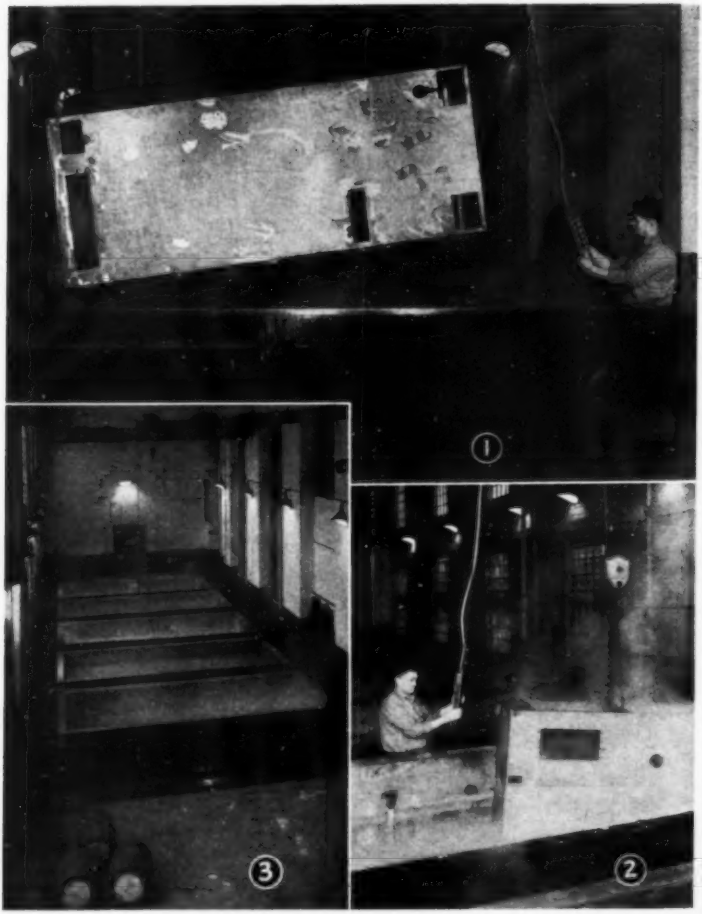
Navy specifications on their painting cover 38 typewritten pages. They call for five coats on hull and bottom, four in cargo hold, magazines, all "tween" deck space, and an engine room that holds a maze of cables and conduits for light, power and control. Spray painting does this job in 25% of the time formerly taken by obsolete hand methods. With time so vital an element in our rearmament program, value of the saving of such an amount is infinite.—DE VILBISS CO.

Instrument Catalog

The Brown Instrument Co., of Philadelphia, Penna. has just issued a new catalog of "Thermometer and Pressure-Gauge Accessories". In the Brown Thermometer, Hygrometer and Pressure-Gauge catalogs, specifications and operating principles of the numerous types and models of instruments are fully covered. This new catalog is presented as a supplement, listing and describing bulbs, sockets, tubing and accessory items for the complete line.



Protective coatings of marine paint are necessary on all ships — and the spray system affords a rapid and economical means of applying same. Photo, courtesy of DeVilbiss Co.



1) A completely welded enclosure is being lowered into the first of five tanks used in the bonderizing process at the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Here the unit is washed in a hot alkaline solution before being rinsed in hot water.

2) The proper Bonderized surface results from immersion in this tank which contains the bonderizing solution. The enclosure is being lifted out of the tank and will be rinsed; then hardened in a tank of hot chromic acid before it is ready to be painted.

3) View of the Bonderizing room showing the five tanks and all facilities for dipping.

Bonderizing Metal Enclosures

FACILITIES to bonderize large metal enclosures for switchgear and electrical control have recently been put into service at the East Pittsburgh works of the Westinghouse Electric Mfg. Co. (see illustrations on opposite page.) The result is a substantial reduction in the handling of these units and a considerable saving in the time required for the bonderizing process.

Formerly the enclosures had to be bonderized in sections and welded together. The welding operation destroyed the bonderized surface, making an unsatisfactory paint base. Reversing the sequence has eliminated this undesirable feature and has also saved much time and handling in the manufacture of these units.

Editor's Note—Quoting from the Parker Rust Proof Co's. illustrated book on bonderizing:

"Like all metal finishing methods, Bonderizing requires a clean surface, and in all Bonderizing installations the proper cleaning and rinsing equipment is usually included in the installation plans . . .

"The processing bath is prepared by mixing the necessary Bonderite chemicals with water and either immersing or spraying the products for a sufficient length of time to transform the metal surface to a phosphate coating. Time required is from one to five minutes, depending upon the method used and type of product being treated.

"The immersion type of Bonderizing installation consists of a simple still tank, fitted with suitable equipment for heating the solution in which the products are dipped . .

"The set-up for immersion Bonderizing ordinarily includes a heated tank for alkali cleaning, a heated tank for clear water rinse, the Bonderizing tank, followed by another hot water rinse and a final hot chromic acid rinse. All units of the installation, including cleaning, processing and rinsing are usually placed in line so that one overhead track and hoist will serve for all the tanks.

"The Bonderizing tank should be insulated to conserve heat and it should be fitted with heating units of sufficient size to maintain the solution at 180° F."

Burning-in With Stick Shellac or Lacquer

MUCH depends upon the ability and ingenuity of the workman as to the results obtained from burning-in stick shellac or stick lacquer to fill or repair a dent, deep scratch, hole, bruised place or crack in a finished surface. In the first place, a great deal depends on the kind of equipment used. Personally, I do not care for the electric burn-in knife, but I do prefer an electric heater over the old time method of heating a knife over an alcohol flame. Understand, I am not criticizing the electric burn-in knives or irons. Others use them and like them. Perhaps I would too, if I set my mind to it.

I prefer to make my own burn-

in knife. I get a good heavy paring knife and shape up the point so that it is not too sharp. I turn the point up slightly so that it will lay flat on the work while being held easily in the hand. It is desirable to use a fairly heavy knife as it will hold heat long enough to work in the stick shellac or stick lacquer, whereas a light knife must be reheated several times.

See that the place to be burned-in is perfectly clean. Be sure that no rubbing oil or polish remains in the low places; this can be cleaned out with naphtha.

Put as nearly as possible just enough of the hot shellac into the low place to fill it up level. Use the warm knife to level it off as nearly even with the surrounding surface as possible. If the repaired place is too high, you have used too much wax material. If it is too low, you have not used enough material. It will require some experience and practice to know just how much stick shellac to melt from the stick to get the best results.

You can use colored shellac to match the spot to be refinished, or, if the colors are okay in the low place, you can use transparent shellac. Here also, much depends upon the workman's ability and experience in knowing just what to use to get the best results.

For cutting the repaired place down level with the surrounding surface, I generally use a small wood block over which is drawn some fine sandpaper dipped in naphtha. This light wet sanding will have to be done very carefully so as to avoid sanding through the finish around the repaired place. However, if the spot is sanded through, it can be touched up with a small brush dipped in the proper color of spirit stain, and finally refinished.

If the article is not to be refinished, much more care must be used in regard to matching the color and cutting down the burned-in shellac. Sometimes you can do it with a felt pad saturated with a rubbing oil and sprinkled with a little pumice stone. If polishing is necessary, a little rottenstone can be used to good advantage.

This is a job that requires a neat workman who has a good eye and the knack of working things out to the best advantage. I will be glad to answer any further questions that I can along these lines.—F. HAGAN.

New Materials; Methods

THE PAINT-USING industries are very much interested in research and in new materials because of the necessity of substituting in cases where certain materials are becoming scarce. It seems that there is sure to be an increase in the use of baking enamels and varnishes on this account. Naturally, this will call for oven equipment, or more likely infra-red baking systems. Increased labor costs will force many plants to conveyorized finishing which, in turn, will require a tailor-made finish to fit the users equipment and time schedule.

From what I hear there will be several new and improved materials on the market, although many consumers are more concerned about getting enough of the same materials they are accustomed to using, rather than trying out something new. We will find that the wise finishers, however, are those who are looking about for something to turn to in case their usual supply is cut off.—AL. MATLOCK.

PAINTS AND PAINTING METHODS FOR *Protective Concealment*

Camouflage Section
The Engineer Board
Fort Belvoir, Va.

A NUMBER of kinds of paints manufactured for commercial distribution are useful in camouflage work. In addition, however, paints geared to the specific needs of protective concealment are also required. In general, the requirements of camouflage paints are: domestic availability; ease of application, single coat if possible; low cost; and a lusterless finish. While a wide range of colors may be used, there is great emphasis on the darker shades, greens, browns, olive drab and grays, which are particularly effective for reduction of visibility.

Durability is frequently of less importance in camouflage than in commercial practice, since much camouflage painting must be seasonal or semi-annual; obviously, camouflage attempting to duplicate the appearance of trees and vegetation in many climates must be green in the summer and brown or gray during the winter months. It is of interest to note that while the vehicle itself need not be particularly durable, the pigment must stand up for the period of time the paint is desired to be effective.

In passing, it should be noted that the lusterless olive drab color adopted by the War Department for all vehicles and equipment is a compromise or "average" color; it was selected to blend with the surroundings during the 12 months of the year throughout the entire country more effectively than any other single color. Other countries have adopted a very similar shade. If it were considered practical to repaint all vehicles twice each year, different and more concealing colors might be chosen.

Military Uses for Paint in the Field

For artillery, tanks, vehicles and similar equipment, two major types of camouflage paint are required: permanent and seasonal. For permanent protective coatings a good example is the present Quartermaster Specification No. 474-C, the lusterless olive drab paints used on military equipment. This and similar coatings are designed for durability, to maintain the dull lusterless color for a long period and to give protection to the surface.

For seasonal or other temporary painting of field equipment, many paints are useful, including cold-water protein paints, silicates, emulsions and others. Such paints must be handled and mixed by unskilled troops in the field, must be easily applied with either brush or spray gun, and must be proof against decomposition under extreme heat or cold. Another consideration for camouflage paint in the field is ease of transportation;

water as a thinner is very desirable because it is available almost everywhere and need not be transported.

For concealing strategic military positions, it is common practice to erect fishnets or chicken wire garnished with strips of dyed cloth woven or tied into it. At present, there is wide use of osnaburg, a cheap cotton fabric, which must be colored in order to be effective. The less durable, temporary paints are suitable for this use and must be adapted for either factory or field application. It is also advantageous if this paint has fireproof or fire-retardent qualities.

Camouflage Paints for Fixed Installations

For buildings, flat but durable paints will sometimes be applied to surfaces of concrete, brick, tile, slate, wood, stone, and various roofings. Similarly, there are many uses for non-protective, temporary paints on these surfaces where the surface is already protected by other means.

Garnished nets of chicken wire are frequently used to conceal straight lines of buildings and roofs, and to eliminate shadows; and the cloth garnishing or garlands must be colored as indicated above. For fixed installations, steelwool is another important garnishing material, and thus must be both colored and preserved in order to permit its use.

Unless covered or concealed, glass skylights and windows reflect a considerable amount of light from the sky, from the sun, and even from the moon. Where such glass surfaces cannot otherwise be covered completely, an application of paint must be made to reduce the reflectivity and at the same time black out the passage of light from within. It is desirable that such paint be removable to restore daylight when the need for such concealment has passed.

It is frequently vital to tone down or to conceal roads and airfield runways; particularly when these surfaces are of white concrete they are noticeable from considerable distances. Paints such as bituminous emulsions, alkyd resins, dyes and stains are used with success. It is sometimes equally important to camouflage dirt and black-top roads which lead to important installations and these, too, are a prospect for proper camouflage coloration. All such coatings should be durable under the wear of traffic. Bitumious emulsions have proved particularly successful as an adhesive for texture materials for this purpose.

The coloration of earth and turf is a device to create false shadows, dummy hedgerows, and decoy buildings to deceive the observer. Earth dyes and dry pigments, bituminous emulsions, and other colorings have been found effective.

Other Uses of Paints in Camouflage

Little need be said about the importance of luminescent or phosphorescent paints which are useful during black-outs. They are useful and desirable for public safety, for traffic control and for maintaining morale.

Another less common use of paint is the application of special varnish filters on the glass of skylights and windows. It is theoretically possible for such filters to eliminate the passage of all visible light from the interior of the building if it is illuminated by specially designed light sources.

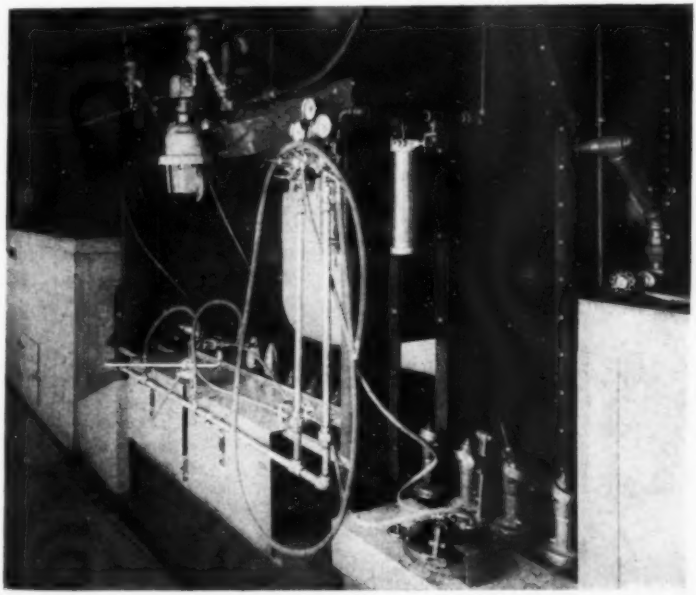
Adhesives are an important field and may be divided into two parts;

the light and the heavy. The former are used primarily for temporary field camouflage to cause leaves, dirt, straw and other natural material to stick to the exposed surfaces of artillery, trucks and other items of equipment. The heavy adhesives are used for more durable camouflage jobs, such as imbedding granite chips and wood chips into roadway surfaces, for fastening slate granules to roofs to provide texture, and other similar purposes.

This list would be incomplete if so-called "disappearing" paints were not mentioned. These are the paints which, according to the newspapers, are invented from time to time and which magically cause objects which have been so painted to disappear in an instant. The War Department is still searching for the magic formula.

What is "Infra-Red" Paint?

One of the ingredients of green leaves is chlorophyll. When vegetation is photographed with an infra-red film it appears almost white because of its chlorophyll content. Other green surfaces without chlor-



Close-up view of spray station where shells are automatically coated. Notice the paint regulators which control the pressure on the paint-circulating system, the oil & water extractor, hose cleaner, the gun-operating mechanism, and the empty spindles, complete with masking rings and plugs, ready to be loaded with the shells. This equipment is now in operation in a new modern ordnance plant. Photograph, courtesy of the Binks Mfg. Co. Published by permission of the U. S. War Department at Washington, D. C.

ophyll appear black. Hence, an infra-red photograph is a useful means of detecting camouflage which is intended to duplicate vegetation. Considerable attention has been given to developing paints which will duplicate the effects of vegetation on infra-red film, and rapid progress is being made.

The Necessity for Research and Development

Constant attention is and must be given to the development of camouflage paints for the following reasons:

1—Few of the present standards and specifications are completely satisfactory. It is vital that they be improved as rapidly as possible.

2—In the event the widespread application of camouflage becomes necessary, vast quantities and a wide variety of paints will be required. Obviously, a number of substitutes for each of the present paint materials will be necessary in order to supply this need, and the specifications for such suitable substitutes must be available in time for possible emergency.

3—Almost daily new methods of camouflage and concealment are being developed. These techniques frequently require new paint materials to make them effective. Research must provide these materials which are so desirable.

Furniture Finishing: Past and Present

I STARTED serving a 3-year apprenticeship at the age of 14 years—$3.00 per week for a 60-hour week during the first year. The first thing I learned was how to properly fill. We were taught to rub the filler into the grain. Nowadays some finishers seem to think that all that is necessary is to get it off as easily as possible. We had to weigh filler, mix it thoroughly and brush it well when applying.

In the old brush days, everything around the finishing room had to be kept clean, for the cleaner the finish the less work in the rubbing room. We were taught that a good clean solid finish should be kept as close to the wood as possible. Nowadays it is the practice in some factories to slight the filling and pile on material, and then do a lot of unnecessary rubbing to get a smooth finish.

We used to figure about five gallons of material for 100 dressers, which was about the average. Then came the spray outfits. I made it my business to learn to handle the spray gun properly, with a minimum of waste. Of course, compared with brushing, there is a certain amount of waste—perhaps about 10% to 15%, if the spraying is handled right.

Some time ago I visited a finishing room and noticed a man spraying shellac on dressers. I asked him about how much shellac it took to cover 100 dressers. He thought for a minute or so and then replied: "From 18 to 20 gallons for 100 dressers. A good spray man should use about eight gallons on 100 dressers. A furniture plant with several spray outfits and spray men like that one would certainly waste a lot of material in a short time.

Today, I notice that in most plants the men are not trained to be careful about wastage of materials and supplies. Even the sanders do not use the paper as they should. Personally, I prefer to train my own men. I find that I get better results that way.—G. B., Finishing Foreman.

LUMINOUS PAINTS

(BLACK-OUT FINISHES)

BY CARL W. McNEIL
Chemist & Metallurgist

WITH the blackout of war-torn Europe bringing the subject to the forefront, I believe that it is timely to acquaint the finishing trade with a few of the facts concerning coatings of luminous nature, known commonly as phosphorescent finishes (derived from the well-known luminous character of phosphorous).

From reliable sources it is reported that the streets of Berlin and certain landmarks are marked with paint of this character. "Glow-worm" buttons painted with it are worn by civilians and soldiers to avoid collisions during the darkened periods. Experiments have been carried out to mark important instrument dials of airplanes with this material so that operations can be conducted without showing lights that are visible for more than a few feet away. Its use has been considered for marking fire control panels of artillery, marking instrument panels on all types of war machines such as radios, armored trains and motorcycles. In most instances the glow from these luminous materials is clearly detected at short distances of say 10 to 15-ft., but it cannot be seen from say 50 to 100-ft., depending on the intensity and magnification of the luminosity.

Luminous paints are difficult to make and the materials most easily obtained are of a war nature; others are high priced. Any chemist who has done research work on these materials will tell you that they are "mean to work with" and that absolute control must be had over them to insure successful compounding.

Phenomena of Luminescence

First, it is questionable whether the phenomena of luminescence has been satisfactorily explained by science. Several theories have been advanced but these are too technical to discuss in this article. It occurs in strange places and materials. For centuries it has been the source of many myths. The phenomena may be viewed in a number of colors depending upon the material causing the luminescence. Most of them are beautiful in shading and have a strange attraction for the uninitiated.

I have done considerable research

Luminous painted surface — One that stores light rays, when exposed to sunlight, and then discharges them (becoming visible) during darkness.

Phosphorescent treated surface (phosphorus plus water)—Discharges light rays under certain chemical conditions.

Fluorescent painted surface — One that reflects or transforms rays, such as near ultra-violet rays, according to rules of the spectrum. Must be activated by an electrical source of near-ultra-violet ("black light") to become visible during darkness.

work with these materials and have seen many a new initiate spend most of the night with a new luminous product, feeding light into it (for storage) and then darkening the room and watching the article glow. Some interesting photographs of this phenomena appeared in the August 4, 1941 issue of Life Magazine.

Obviously it would be unfair for me to reveal the closely guarded trade secrets used in the manufacture of some successful luminous paints. So the facts in this article will be true but will not be all-revealing. It remains for your chemist to whip the difficulties—if and when he can. Before starting on the project he should acquaint himself with all the known facts compiled in research which, unfortunately, are scarce and of a highly technical nature.

Principal Ingredients in Luminous Paints

The principal ingredients of most of the luminous coatings for sale are the sulphides of calcium, zinc or strontium. These can be bought as such. However, not all of these materials are always luminous. Calcium sulphide is made by one company in a C. P. (commercially pure) form which fluoresces. The C. P. product of another company does not show luminous under similar conditions. It may be well to state here, however, that most earth sulphides are more luminous in an impure state than in the pure. Some authors claim that luminosity is caused by impurities as much as by the sulphides.

Other authors claim that these certain impurities need not be present to make it luminesce. Zinc sulphide which fluoresces in bluish-green is usually too expensive to be used at all, and it is hard to get. A new process has recently been worked out to produce it quite cheaply but, so far, this plan has lacked a financial backer.

Strontium sulphide is not made to any extent and it presents special problems in manufacture. The thiosulphates of strontium and barium produce good effects but both are of a high price as the market now stands. Their cost could be reduced considerably but special apparatus would have to be made for their manufacture. Luminosity occurs in the natural state of fluorspar which is largely calcium fluoride, but it does not occur to any great degree in the chemically pure compounds unless certain impurities are present.

The colors that can be produced readily in luminescent paints range from orange to yellow to green to violet. These are the most common and easily prepared. While a red color can be obtained, it involves a costly and complicated procedure.

The green luminosity of radium salts is different from the materials under discussion here. Their luminosity is caused by their radioactivity and is undesirable because this activity is injurious to human tissue. Used in small quantities the danger is not too great, but the expense of the radio-active salts almost probihits their use. Many of the inexpensive sulphates of metals have luminous properties but, as a rule, they do not produce the desired effects under proper conditions. The use of phosphorous is definitely prohibited because of its toxic effects and the fact that the material is a flammable element. Control of its luminosity is too difficult.

Calcium sulphide has been the main ingredient of most luminous paints and has been used for coat-

WE NEVER SAY GOOD-BYE—

• When you buy VEDOC scientifically formulated for your needs and it starts flowing through your plant—that's only the beginning.

Ferro's laboratory and shop-trained service engineers will be around to see you often, checking and double-checking to keep things running smoothly, watching for symptoms, preventing trouble *before* it happens! Also, they are always there at the top of the brass pole ready to slide into your plant on a moment's notice, to diagnose and prescribe for any kind of a finish problem.

Ferro never says "Good-bye" to a customer, either large or small.

LIQUID PLASTICS DIVISION
FERRO ENAMEL CORPORATION
CLEVELAND, OHIO

Vedoc! THE LIQUID PLASTIC FINISH

ing lamp shades and figurines on crucifixes for years. Some paints contain small amounts of zinc sulphide. A bright violet luminosity can be obtained after the articles coated are exposed to light, either to the sun or to artificial light, the latter requiring longer periods of exposure. Manufacturers claim that the luminosity will continue for as long as eight hours. I have produced such specimens but they are not common.

Calcium sulphide of good quality will emit quite brilliant rays for three or four hours—and more if zinc sulphide is added. Zinc sulphide of certain quality is much brighter than the calcium result, but we discard this material because it is too expensive. It is greenish in brilliance. Both of these hues turn to a white light after a while.

While we do not know exactly what causes luminescence of the compounds, we do know that ultra-violet rays are probably those that are most easily stored, because the mercury quartz lamps will quickly charge them. Some seem to get more brilliance from the lamp than others. It is evident that other rays are absorbed and discharged, as artificial electric light does not contain a great percentage of the ultra-violet rays. In the case of calcium or zinc sulphide, this artificial light brings excellent results, although the storage capacity seems to be better in the case of real sunlight which has a greater percentage of ultra violet.

Fluorescent Paints Glow When Activated by Near-Ultra-Violet

In many of the luminous materials in this field being discussed, there is great promise in the fact that they will fluoresce in the presence of "dark light" which is now being produced in cheap near-ultra-violet lamps. The quartz lamp was too expensive and too short lived to be considered for use with these materials. However, the major electrical companies are now producing cheaper near-ultra-violet lamps that will soon give enough rays to have a whole room fluoresce in different colors at little expense. It only remains to produce the paint at a reasonable price.

The cheapest method of producing a luminous pigment that I know of is by employing the formula of Balmain. The process is the production of a properly impure calcium compound. The formula is:

Calcium oxide (burnt lime) free of iron	20.00
Starch	6.00
Bismuth nitrate (0.5% solution)	1.00
Sodium chloride	0.15

(The figures used are parts by weight)

Mix these materials dry; heat the mixture for one hour at 2372° F. Reduce to a powder. Do not grind. Friction seems to reduce luminosity of all powdered pigments.

This product gives a violet light after exposure to sunlight or artificial light, and a better result after exposure to ultra-violet light (any source of supply).

The heating of barium of strontium thiosulphates with small quantities of the nitrates of uranium, bismuth or thorium will give good results, but these products are really too expensive unless a cheap source is found.

There are many other formulas but most of them need careful chemical control and supervision. They are out of the question for the manufacturer who cannot make his own compounds, as the major chemical firms have either neglected the making of many of the need-

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McCORD Radiator & Mfg. Co., of Detroit, has used DeVilbiss Spray Equipment for many years, in its regular business of making automobile radiators and other automotive parts. But now McCord is also producing the new U.S. Army Model M1 steel helmets—a defense job that involves a different and unusual finishing problem.

Army specifications require these helmets to be painted inside, and that the outside be given a coating of paint and granular cork to kill light reflection.

A DeVilbiss spray machine finishes these "Battle Bonnets" inside and outside in a single operation, enabling McCord to turn them out fast enough to equip an army division every day.

DeVilbiss is helping manufacturers in every field to meet the new and unprecedented demands of defense manufac-

...makes BATTLE BONNETS

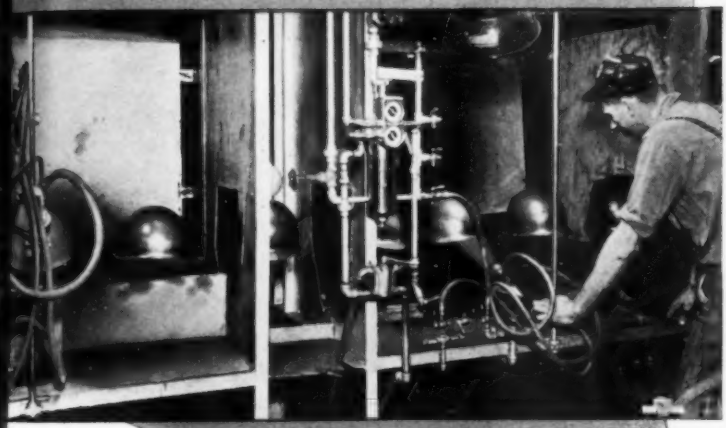

Photo by McCord Radiator & Mfg. Co.

turing. If you're making any type of equipment or munitions that must be painted for protection, identification, decoration or camouflage, DeVilbiss Spray Systems will speed up your finishing operation.

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DEVILBISS SPRAY SYSTEMS

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Because this Annual Defense and Review Edition of INDUSTRIAL FINISHING magazine will have an unusual appeal, manufacturers of finishes, supplies and equipment will have a splendid opportunity to point out the merits of these goods for both defense and civilian purposes. Display advertising is an effective and economical avenue of approach to potential markets—metal, wood, plastic, composition, etc. Make arrangements NOW for an attractive sales-stimulating ad on finishes; finishing equipment, or supplies. Write for rate card and further details.

Do not fail to get the January DEFENSE and REVIEW issue

Every user of materials, supplies and equipment having anything to do with production finishing for defense or civilian purposes will want to read this Big January, 1942, Defense and Review Edition of INDUSTRIAL FINISHING magazine.

New developments in finishes to expedite Defense production demands; substitute and replacement finishes that have been formulated to meet the emergency; finishing processes engineered for current needs—all will be reviewed in this issue. It will be thorough and practical in its editorial treatment, and will prove a handy reference book throughout 1942. Don't fail to get a copy.

— OUT JANUARY 18TH —

INDUSTRIAL FINISHING Magazine, Indianapolis, Ind.

ed ones or are selling them for war use.

It is in the combination of cheap ultra or near-ultra-violet rays and in the production of cheap ffuorescent paints that the phenomena will find good usage. The interior of an airplane and its instruments can be coated and fed by "dark light" rays. The treated surfaces would fluoresce to the advantage of occupants and could not be seen a short distance away. Parachutes and bomb releases could be coated to produce different colors under the influence of the same ray. They would be readily distinquishable by their hue.

Vehicle for Luminous Paints

We must not forget to mention the really big problem in the manufacture of luminous and fluorescent paints. That is the difficulty in securing a vehicle in which to suspend the pigments you prepare. Any vehicle must be absolutely neutral to any reaction with the pigment. All sulphides react very easily as they are unstable. With water they form hydrogen sulphide which has a vile odor. The solutions of cellulose acetate or nitrate (lacquers) contain excessive water and can be used with only limited success.

To my knowledge, the best known vehicles are prepared from methyl methacrylate (Lucite) or vinyl acetate plus solvents. However, these are war materials and are somewhat difficult to secure. There are several methods that any good chemist can work out but which I could not ethically divulge at this time. The thiosulphates do not react so easily and they can be used with vehicles which are easy to obtain.

While there are some fairly good products on the market it is hoped that some company will soon do more extensive research work along this line so that better and lower cost luminous paints will be developed for the benefit of the government and the public in general.

Luminous Plastics

Luminous plastics have been manufactured with varied success. Really, these plastics are only the solidified forms of the various finishes produced in the acrylic, cellulose and vinyl sections. However, their use has been restricted because plastic articles are somewhat small, and special plating of the injection machinery and die molds is necessary to prevent the chemicals from reacting with the iron present. Best results would also require a chemist to control the product, and this usually costs too much. The acetates molded by machine and dies usually set up a bad odor, and those made with inert plastics of thermoplastic nature are out of the question because these materials cannot be obtained. They are war materials. Used in Lucite (Dupont) and Crystallite (Rohm & Haas), very fine results can be obtained, as the material seems to intensify or magnify the luminosity. Good results can be obtained where the pigment is embodied in cast sheet form, where the water absorption is well controlled.

I have made luminous fish baits of Lucite molded by the injection process. They resisted water absorption well and fishermen declared that they were of superior quality. The work was done on a fee basis but it was soon discarded by the client as being too expensive. Now Lucite is snapped up by war demands. The special machinery cost was too great in this case.

Since that time another vehicle has been found. It is of superior

quality and not affected by war demands. Considerable work on the colors and experiments with different sources of ultra-violet rays were also conducted. The results were all pleasing enough to warrant further investigation—when I find time to do it. To me the work has always been considered as a pastime of the hobby nature. It was carried along with impregnation work of another nature, where it fitted itself in without too much waste of time or money.

Inquiries on the subject of luminescent paints will be answered in a more technical vein if addressed to me through this magaine.

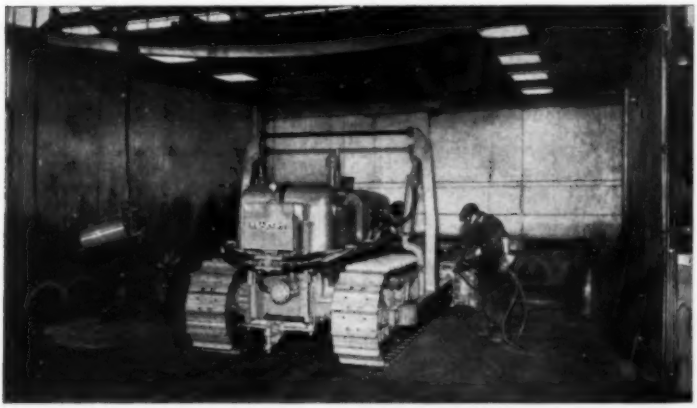
Spray-Painting Truck and Tractor Equipment

THE up-to-the-minute plant of the Baker Mfg. Co., Springfield, Ill., oldest and largest manufacturer of snow plows for trucks and tractors, and tractor equipment, includes a modern spray booth with a water curtain ventilating system for washing fumes from the air.

As shown in the accompanying picture, various members that go to make up the "bulldozers", "gradebuilders" and other tractor attachments, as well as parts for snow plows suspended from a monorail system for spraying. In those cases where snow plows or tractor equipment are to be installed on new Allis-Chalmers tractors (which are made in a large plant adjoining that of the Baker Mfg. Co.), the tractors with the attachments installed are run into the spray booth for "touching-up".

The added equipment is usually painted the standard color of the tractor on which it is to be installed, unless otherwise specified. For example, the tractor shown here is an Allis-Chalmers unit painted Persian orange, and the Baker equipment made for it is finished in the same color.

When these units are made for other tractors, they are finished in the color used by that manufacturer.—BINKS MFG. CO.



Here everything modern is supplied for spray-painting trucks, tractors and accessories. Photograph supplied through the facilities and courtesy of Binks Manufacturing Company.

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Tung Trees in the U. S.

PRODUCE TUNG OIL FOR FINISHING MATERIALS

Do you know that:

1) Tung oil is one of the fastest drying vegetable oils known.

2) Tung oil is extracted from the kernels of the tung nut.

3) The paint and varnish industry takes 75% of the tung (China wood) oil used in the U. S. A.

4) Tung trees have been growing in the U. S. for 35 years.

5) Tung oil from commercial tung tree orchards in the U. S. is better than that obtained in China.

6) More than 175,000 acres of tung trees are now in useful production in our southern states and more plantings are being made.

7) Intensive plantings have yielded as much as three tons of nuts per acre—200-lbs. per tree.

8) Cost of producing tung oil, where intensive methods are practiced, is about 5 cents per pound.

BY W. M. SMITH, JR.
Technical Adviser
Reasor Tung Plantations, Inc.

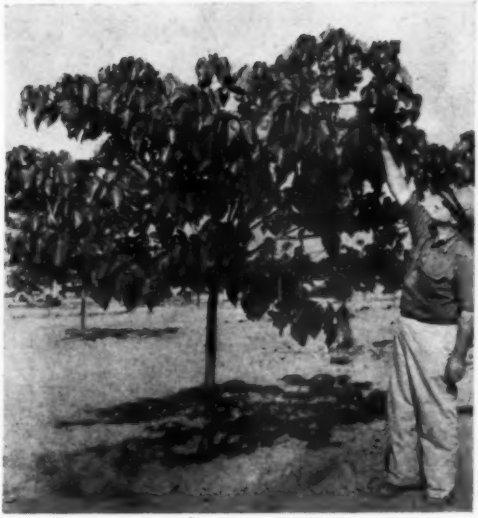
TODAY THE NAME of "Tung Oil" is recognized by millions. Tung oil is one of, if not the fastest-drying vegetable oils known to science. Among the requisites for a drying oil are: Speed of polymerization, rapid drying, flexibility, insulating qualities and resistance to heat, weather, water, acids, etc. While other oils may have some one or several of these features, only tung oil possesses them all. It stands alone in its excellence.

Used in China for Thousands of Years

Tung oil has been used in China for thousands of years, but was unknown in Europe until the 13th century, when Marco Polo mentioned it in describing his travels. It was introduced by the Portuguese trading with Canton in 1516, but no appreciable market developed until the middle of the 19th century. It was first imported into the U. S. in 1869, but the great increase in world consumption has occurred since the world war.

The word "tung" is Chinese for "heart," the heart-shaped leaves accounting for the name. Tung oil, or "China wood oil," as it is frequently called, is obtained by pressing the kernels of the tung nut. This nut is about the size of a small apple and contains, usually, about five seeds or kernels. The husk of the nut is removed and the kernels are ground and pressed to expel the oil.

Tung oil is as old as China's painted idols, as new as tomorrow's plastics; it made ancient lacquer, it revolutionized modern varnishes; it protected Chinese junks, it improves our modern cars; from India ink to lithographing ink was



Typical tung tree in a large orchard, bearing nuts. This tree is only 31 months old. It was planted in March, 1938; photo taken Oct. 1940.

but a step. This amazing oil is utilized in many forms and places; in linoleums, automobile brake bands, electrical insulations, waterproofing, leather dressing, insecticides and medicinal compounds, coatings for cosmetic tubes and tin containers—these to mention but a few of its many uses. The unique characteristics of tung oil have created demands from an ever increasing variety of manufactured products. It is not surprising that the U. S. has for years absorbed three-fourths of the total available world's supply.

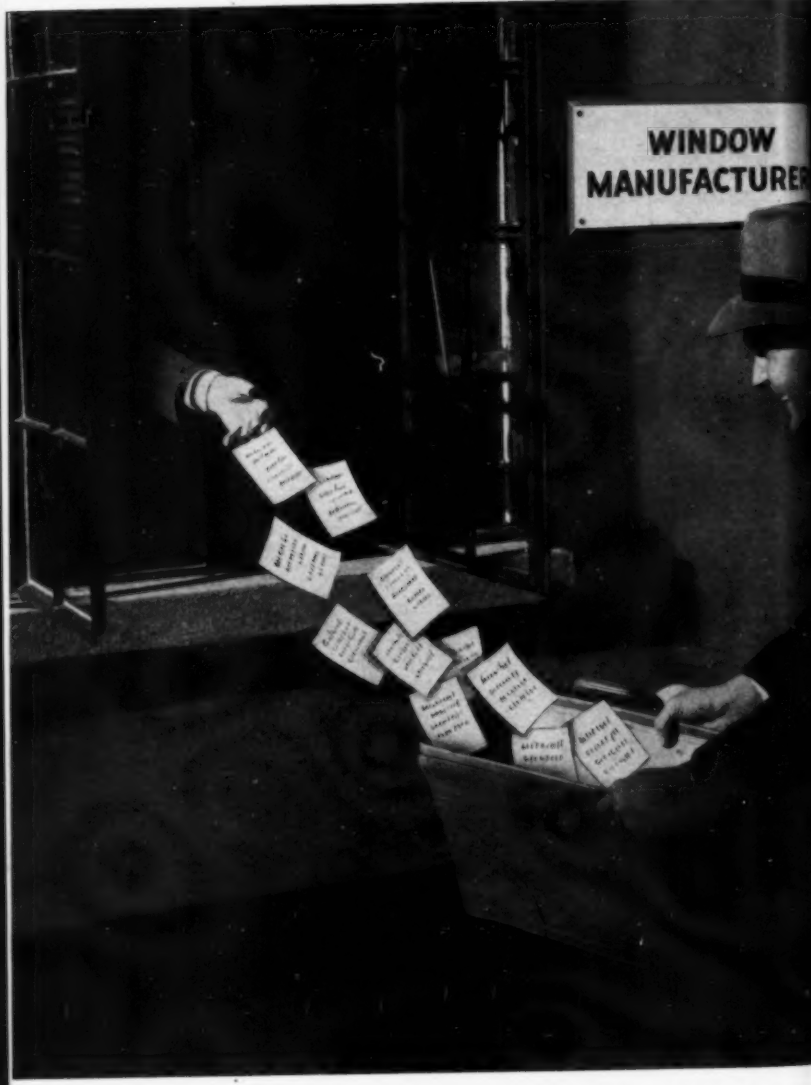
The danger of complete dependence on a foreign source of supply became evident about the beginning of the century. At that time it was determined that efforts should be made to establish an American Tung Oil Industry. The results accomplished during these four decades are surprising; the promise of the future is amazing.

It is true that the paint and varnish industry takes about 75% of all tung oil used in this country, but to illustrate how much tung oil may be needed by a single user, in a comparatively incidental field, W. J. Cameron of the Ford Motor Co., stated in a Sunday Evening Broadcast as long ago as 1935: "To fulfill its announced intention of making a million cars this year the Ford Motor Co. will purchase many products . . . . and because we shall use 728,000 gallons of tung oil, which 16,000 acres of tung trees will produce, a new tree industry is being encouraged in the U. S." This adds up to 6-lbs. of tung oil per car.

First Tung Seeds Sent Here in 1902

The first tung seeds were sent to this country by an American Consul in China in 1902. With the introduction of the tung tree there

"OUT THE WINDOW"



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There's a reason why the Du Pont man is able to help *keep out* complaints. His service represents the total experience of many skilled specialists—research chemists, laboratory technicians, production men, service engineers, field representatives—all with the finest of facilities for developing, making and applying better finishes.

It is this *teamwork* coupled with years of experience which gives Du Pont that extra "know how." That's why so many manufacturers have turned to Du Pont for assistance. They know their problems are in the best possible hands . . . and that, as new finishing problems come up, Du Pont will tackle them and come out with the right answer.

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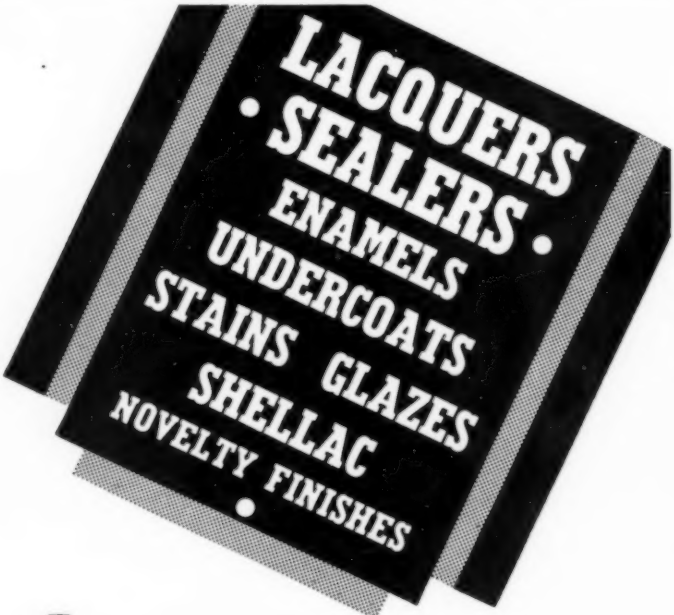

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began a quarter of a century of pioneering, attempting to adapt the tree to a new habitat. This was a period of "trial and error," and it seems that there were even more "errors" than "trials." Everyone had a finger in the pie; state and government experimental stations, the paint and varnish industry, scientists, sincere developers and, sad but true, the "hit and run" promoters.

During 25 years of growing pains considerable knowledge was gained. One by one the reasons for failure took form as the preferences of the tung tree became known. A number of "accidental successes" occurred. These trees and groves thrived, to prove that tung trees could produce, would produce, and continue to produce for many years. The oldest surviving trees were planted in 1906; the oldest grove in 1908.

And then, in 1932, there was published a booklet entitled "Tung Oil," by Dr. C. C. Concannon. This booklet could be likened to a Beacon which served to point out the course to tung oil success, enabling anyone to avoid the shoals and sand bars of failure. Those who chose to disregard these warnings could not and did not succeed. Since 1932 new horizons have broadened our outlook, so that today we have the benefit of much additional knowledge and experience.

U. S. Progress in Growing Tung Trees

Progress has been made in growing tung trees, and rapid progress, in the decade following the "Experimental Age." The U. S. Department of Commerce has, from time to time, stated the acreage planted with tung trees: Plantings in 1930 amounted to approximately 4300 acres; in 1935, 40,166 acres; in 1937, 103,125 acres, and the most recent statement, as of December 1939, estimated plantings at 175,000 acres. A 40-fold increase in 10 years is quite a growth, but it is not enough; the pace must be stepped up, the quality of development must be kept up. The distribution of tung plantings in 1937, which totalled 103,125 acres, was Mississippi with 63%, Florida with 17%, Louisiana 15%, Georgia 3½%, with Texas and Alabama sharing the remaining 1½%.

In 1939 the Department of Commerce placed our normal annual domestic consumption at 150,000,000-lbs. and our 1938 domestic production at 3,000,000-lbs.—only 2% of our annual requirement. At present our imports from Cnina are about 1,000,000-lbs. per month —only one-twelfth of our requirements. With such conditions confronting us, with the present day determination to free the U. S. from dependence on foreign sources of supply, it is imperative that the development of our domestic industry be accelerated as much as possible.

During the two score years of this 20th century we have learned more about the tung tree than have the Chinese since the dawn of history. We use the might of machines to prepare our land; iron horses do the work of human hands. We measure our plantings in miles. We know the trees preferences and prejudices, how it responds to care and resents neglect; we have multiplied its yield and greatly lengthened its productive life. We deliver the nuts to a robot which performs the work of a thousand coolies. This robot returns to us with one hand tung meal, valuable as a fertilizer and

possessing tremendous potentialities. From the other hand flows a stream of crystal-clear honey-colored oil, superior to and commanding a premium over the Chinese product. And we do all of this at a lower cost than is possible in China.

Where Tung Trees Thrive and Produce

To grow tung trees most advantageously requires that we determine "Where" and "How." "Where" requires that the utmost care be exercised in the selection of land to be developed, and "How" necessitates that the very best practice and method be followed to obtain the best results.

In deciding "Where," we know that the tung tree is exacting in its demands. Given the proper climate, rainfall, soil and drainage, it will show its gratitude in its yield. If its needs are denied the tree will not thrive and may even die.

It has been proven that the cultural range of the tung tree is limited to a belt not over 100 miles wide along the Gulf Coast, comprising the eastern section of Texas, the southern portions of Louisiana, Mississippi, Alabama and Georgia, and about the northern one-fourth of Florida. This belt corresponds roughly to the limitations represented by a maximum of 15 days and a minimum of five days of freezing temperatures per year.

The tung tree is deciduous (its leaves fall once a year) and needs a prolonged dormant period, consequently it does not produce well in sections where the climate is too mild. Since no exceptionally hardy strains have, as yet, been developed, it is unsafe to plant too far north.

The tung tree requires ample moisture and grows best where the annual precipitation is 40-in. or more, distributed throughout the year so that there will be no protracted dry spells. Better results are obtained where the rainfall is in excess of 50-in.

Virgin soil has been found superior to land which has been cultivated and, perhaps, worked out. The soil should be acid in character, even in the sub-soil and be free of phosphates or limestone in harmful quantities. Cut-over timber land has been found best, but only soil analyses can actually determine its suitability.

The tung tree has a long tap root which will rot if it encounters water. The tree should not be planted where hardpan or water is found within 20-ft. of the surface of the soil. Hardpan will frequently form a water table and may prevent penetration of the tap root. "Air Drainage" is also of great importance, so the trees should be planted where the ground is rolling, so that the cold air will flow away along natural depressions and bottom lands.

How Tung Trees Should Be Grown

As to "How" tung trees should be grown, there are three types of planting which have been, and are still being practiced: These are, 1) Strip planting, 2) Modified planting, 3) Intensive planting . . . .

Results from these three types of plantings show tremendous differences.

The majority of early plantings were of the Strip type and the results therefrom have been so negligible as to prove, beyond question, that this practice should be entirely discontinued. The trees have produced practically no results, as

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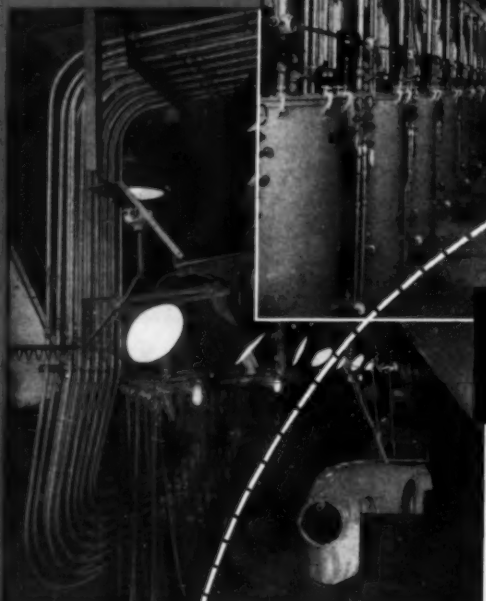
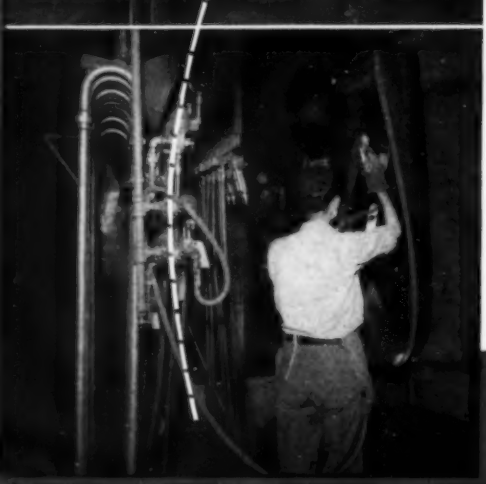
A large paint circulating system recently installed by BINKS in one of America's largest automobile plants.





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The secret of fast, uniform finishing at all spraying stations or booths in your finishing department is absolute control of color, viscosity and pressure at every point. A BINKS PAINT CIRCULATING SYSTEM gives you this control. Finishes are scientifically mixed in large batches under ideal conditions in specially equipped mixing rooms. They are sealed in spotlessly clean tanks in which they are constantly agitated by mechanical means. Circulating pumps force the paint through a closed system of pipes to *all* spraying stations at a set speed and pressure. Each color has its own tanks, pumps and pipes. Binks material fluid pressure regulators maintain a uniform fluid pressure at all guns. Removable keys make it possible for the foreman to set these regulators at the correct pressures for most efficient work. BINKS PAINT CIRCULATING SYSTEMS are of the "loop" type. Whether the guns are in operation or not, the paint keeps circulating past all stations and back to its tank. This eliminates all chance of settling and maintains uniform consistency throughout the batch. Tanks can be refilled and line filters cleaned without slowing up production.

WRITE TODAY for full information. A Binks Engineer will be glad to call at your plant and give you his recommendations without obligation.

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far as commercial crops are concerned, and the failure of such plantings has, without doubt, delayed the progress of the tung industry.

Modified plantings have produced results much better than Strip plantings. These results show great variance on account of different practices in cultivating and fertilizing. However, the yields obtained have been fractional as compared with Intensive plantings.

Intensive plantings leave nothing undone to give the tung tree its best opportunities. Whatever additional outlay is required will be more than repaid by the increased yields from strong well formed trees.

Yield in Nuts per Acre

There are practically no reports of yields from Strip plantings and it is impossible to make any estimate of such yield on a per acre basis.

A commercial grove of nearly 10,000 acres, a Modified planting, has produced an average of from 400 to 600-lbs. of tung nuts per 100 to 200-lbs. of nots per tree.

Intensive plantings have yielded one ton, two tons and even three tons of nuts per acre and recorded productions have even averaged 100 to 200-lbs. of nuts per tree.

Cost of Production

The cost of producing tung oil has been placed at 5 cents per pound by men who are growing tung trees by intensive methods. As more and larger intensive plantings come into production, this cost may be substantially lowered. There are by-products, as well, to offset these costs. For every pound of tung oil expressed by milling, there will also be approximately 2½-lbs. of hulls and 1½-lbs. of pomace or tung meal.

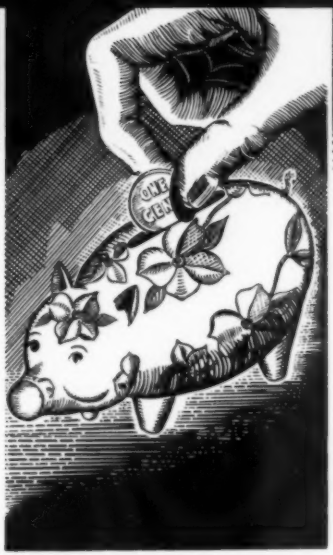
The hulls have little or no commercial value at present. The pomace has considerable value as fertilizer, being similar, in chemical analysis, to cotton-seed meal, and is worth upwards of $20 per ton. Since milling leaves from 4% to 6% of the tung oil in the pomace it cannot be used for cattle food, but this oil content has aroused the interest of the plastics industry. What value may result from this, no one can say.

U. S. Tung Oil Better; Age of Trees; Prices

In comparing Chinese and American tung oil, it is found that the domestic oil has generally brought a premium over the imported oil. Even if a cash premium did not exist, there would still be a marked preference for domestic oil on account of its superior quality and the better results obtained.

As to the age attained by tung trees, no one can speak with certainty. One authority says 50 years or more; another expert claims 100 years. We do know that the oldest trees in this country, from 30 to 35 years old, are still yielding good crops and, to all appearances, should continue producing for years to come.

The selling price of tung oil has ranged from a minimum of 5½ cents to a maximum of over 40 cents per pound. The normal price of recent years has been from 15 to 18 cents, which is a satisfactory figure. The current price approximating 30 cents is undoubtedly due to conditions in China. A price satisfactory to both growers and users would be about 15 cents per pound. This would afford the producer a profit and would also be acceptable to consumers.



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FINISHES

TUF-TEX RUBBING VARNISH SPEDE-VAR
DURATONE STAINS SYNTHENOID ENAMELS
LO-VIS-LAC LACQUERS
VENEER-ITE AND BONNIE WOOD

RELIANCE VARNISH COMPANY
INCORPORATED
LOUISVILLE KENTUCKY U.S.A.

Finishers' Hand Cream

The Simplex Chemical Corp., 26-21 Jackson Ave., Long Island City, N. Y., announces "Liganto"—a liquid compound which, rubbed on your hands, will dry in two minutes and cover the surface of the skin with a thin, nonpermeable, elastic film, similar to a glove, which only water will dissolve. This glove-like film is visible by its luster thus indicating any spot on the hands left uncovered.

It guards the workers' hands against skin-irritations, infection and dermatitis frequently resulting from contact with strong solvents like benzine, turpentine, thinner, tuluol, etc.; leaves the hands smooth and soft, and makes it unnecessary to use strong soaps or strong solvents to clean up. One application will last three to four hours unless you wet your hands. When through work, wipe off excess dirt and wash with soap in running water.

Service Repair Kit

A complete outfit of tools, materials and supplies for quickly repairing and renewing any kind of damaged finish is announced by Finishine Laboratories, Inc., 319 S. Clinton St., Syracuse, N. Y.

Items included in the kit (52 in all) can be used for repair jobs on the finishes of all kinds of furniture, radio cabinets, show cases, fixtures, refrigerators and all types of porcelain. Everything is provided for use in making burn-in repairs to fill and level up deep dents, scratches, etc.

The chest in which the items are carried is a new type, super steel, heavy-gauge cantilever construction, with leather handle. This kit is the nationally known Lubrisol Pad-O-Paque Process that will enable anyone to produce thoroughly first class work in less than 10 minutes practice without any instructions.

52 items are included in this outfit for repairing damaged finishes.

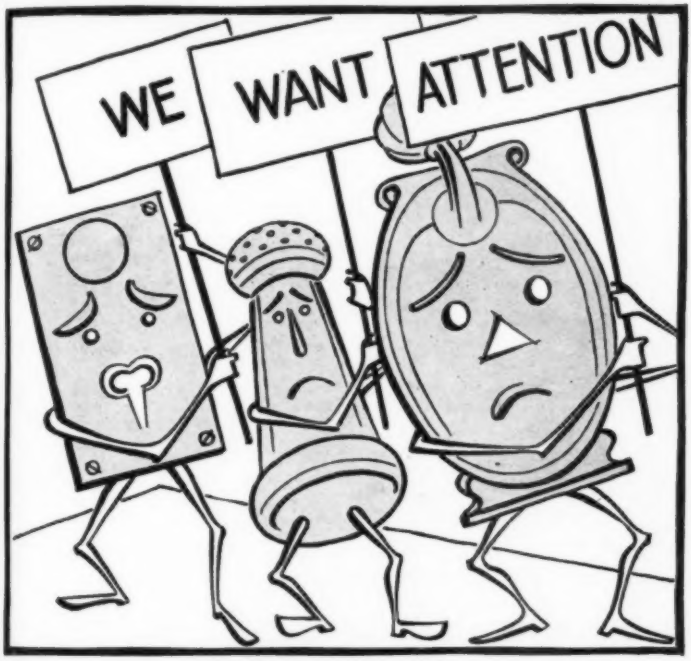
New . . .

MATERIALS SUPPLIES EQUIPMENT

Substitute for Aluminum Paint

Light Gray Totrust, a product announced by The Wilbur & Williams Co., Park Square Bldg., Boston, Mass., serves as an excellent substitute for aluminnum paint, according to the company's literature from which we quote the following:

"Light Gray Totrust looks like aluminum paint; has approximately the same light reflection as aluminum paint; costs much less than aluminum paint, and possesses many other interesting features. In addition, rust can now be stopped at its source by the use of this unusual penetrative paint. The unique oil vehicle, embodied in all Totrust, covers penetrating pin holes and rusted pits in the metal, expelling any moisture which may be present; surrounding and effectively iso-



Do Your Novelties Feel Neglected?

Expert finishers know that metal novelties require just as much care and attention as larger pieces. That's why leading manufacturers depend on our industrial tapes for perfect color separation, striping and masking, as well as for insurance against scratching the surface or finish in transit. You'll find these modern tapes which stick at a touch are a real help in speeding up production. They need no moistening, fit snugly, come off cleanly. Send for free samples.

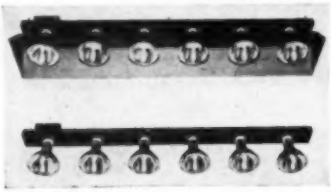
INDUSTRIAL TAPE CORPORATION
NEW BRUNSWICK, N. J.
HEADQUARTERS FOR EVERY TYPE OF TAPE

lating any particles of rust; and forming a hard, durable and yet flexible film.

"Light gray, and other colors, paint right over galvanized metals; have no odor to penetrate food products, and eliminate most surface preparation costs. One gallon covers approximately 800 to 1200-sq.ft., and is not affected by a vast range in temperatures from below zero to 800° F. It can be safely applied to damp metal or solid rust."

Infra-Red Strips for Quick Drying

Infra-red drying strips are designed for use with R40 internal reflector drying lamps and are available in various lengths and lamp spacings to meet



Available in many sizes and lamp spacings.

individual specifications for heat requirements governing any area to be heated or baked.

Strips are made with minimum lamp spacings of 5½-in. on center for applications requiring intense heat, to spacings of 10-in. on center where only a moderate amount of radiated heat is required.

These strips are standard in lengths up to 8-ft. and are furnished wired complete for either 105 to 125 volts or 210 to 250 volts. A junction box mounted in rear of strip facilitates connection to outside circuits. Complete banks or tunnels—fixed, adjustable or portable—can be furnished to customer specifications. These strips are products of The Op-Al Electric & Mfg. Co., 1951 Martindale Ave., Indianapolis, Ind.

New Model "XL" Easy Electric Sander

To meet the gruelling service of 2 and 3-shift duty demanded today by the defense industries, the manufacturers of the Easy sander announce an

Has many improvements which increase its value as a continuous production machine.

improved model. The new model Easy XL embodies numerous improvements. Vibration has been reduced to a minimum through precision balancing and redesign of handle mountings. An interchangeable front handle, which can be shifted from front to side position, enables the operator to work into close corners, at right angles and directly against vertical surfaces.

An improved type fan and baffle plate increase the flow of air through the motor, insuring adequate cooling. The motor, filter and switch are now readily accessible through use of a new type motor filter cap. These machines are available with 110 or 220-volt motors.

The Model XL is designed and built to deliver maximum efficiency and performance on every finishing application—sanding, rubbing, polishing—on metal, plastics, wood, leather or composition materials. For complete details, write the manufacturers for literature and application information. A product of The Detroit Surfacing Machine Co., 7433 W. Davison, Detroit, Mich.

Air-borne MENACE

THE parachutist arrives no more stealthily nor with more devastating results than do rust, corrosion, tarnish and a host of other air-borne enemies so harmful to your product. There may not yet be a perfect defense against the parachutist but there is a defense against the elements which endanger your products . . . a defense which thousands of manufacturers have found to be the perfect protection against "air-borne menaces" . . . Egyptian Finishes!

Many of the finishes in the extensive Egyptian line are so perfectly suited to National Defense work that they are rapidly becoming approved standards for manufacturers engaged in this undertaking. We would like to tell you more about Egyptian Finishes in relation to defense work. Just tell us what the job is and we will be glad to recommend a proper Egyptian Finish for it.

THE EGYPTIAN LACQUER MANUFACTURING CO.
ROCKEFELLER CENTER NEW YORK

EGYPTIAN FINISHES

EGYPTIAN Superior FINISHES

Portable Infra-Red Drying Units

The accompanying illustration shows a 7-lamp model which has been added to the line of drying units developed and manufactured by The Op-Al Electric & Mfg. Co., 1951 Martindale Ave., Indianapolis, Ind.

Higher vertical rods are available for this portable adjustable 7-lamp drying unit.

This infra-red drying unit is adaptable to a wide variety of industrial applications such as laboratory tests, panel and cabinet repairs and automobile spot work. It furnishes an abundance of radiated heat. Temperatures range from 450° F. at 3-in. from the work to 250° F. at a distance of 18-in. in 16 to 24-gauge sheet steel.

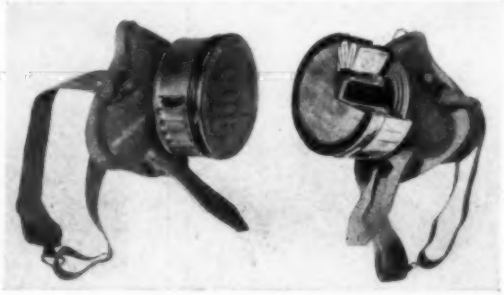
The unit is 21-in. in diameter and is fully adjustable to all angles and from floor level to a height of 5-ft. Longer stems for operations above 5-ft. can be furnished. Bases are cast iron of ample size to prevent tip over and are equipped with ball-bearing casters. Standard equipment includes 15-ft. of super service cord and approved detachable connectors. One model is equipped with a switch in rear of the housing. Another model has an automatic timer built into rear of lamp housing.

DeVilbiss Offers New Respirator

A new respirator that affords maximum protection against the inhalation of pneumoconiosis-producing and nuisance dusts, has just been announced by the DeVilbiss Co., Toledo, Ohio.

Approved by the U. S. Bureau of Mines, the new DeVilbiss "M S D" respirator is said to embody nine unique features. These combined, make it more compact, lighter, easier to breathe through, more comfortable to wear, and easier to clean and maintain than previous models.

In the new respirator, a scientifically and compactly designed cartridge, measuring only 2⅞ by 1¼-in. and weighing but 1-oz., actually provides



Complete and cutaway views of new DeVilbiss "MSD" respirator for workers' protection.

Eliminating "GUESS WORK"

Now, more than ever before, is there need for special formulation. Coatings for defense purposes . . . for guns, ships, planes, shells, and hundreds of other items . . . require exceptional attention in order to meet specifications. Walker makes protective coatings for every purpose, but especially to fit all-out defense needs. They are custom-made—no guess-work!

Here's Your Dependable Source of Supply for All Types of Industrial Finishes . . . . .

PRIMERS—SURFACERS—LACQUERS

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H. V. WALKER CO.

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MODERN PRODUCTION FINISHES

more than 41-sq. in. of breathing and filtering area. Ingenious multi-vane construction allows every inch of this filter to be used efficiently. This means no air restriction to cause difficulty in breathing, plus greatly increased filtering efficiency.

The filter is easily cleaned by blowing accumulated dust from vanes with an air dusting gun or nozzle, thus maintaining peak performance and requiring less frequent replacement.

The new DeVilbiss "M S D" respirator is designed to fit, closely and without leakage, the contour of practically any face. This is an important feature, for full protection depends upon a good fit.

More concerns are showing interest in protective devices of this kind, since they have had to employ so many new and inexperienced workers.

Black Finish for Iron and Steel

In many defense plants the Jetal process, original patented method of blackening iron and steel, is confirming in actual production the extraordinary results of comparative laboratory tests. As a result of these extensive tests, Alrose Chemical Co., Providence, R. I., now announces and guarantees that its Jetal process will:

1). Give 250% more abrasion and wear resistance than any black finish on the market.

2). Resist rust 50 hours and more in salt spray test, when after-treated with Jetoil.

3). Save half the time required to obtain above results, as compared with any other method.

4). Effect 30% or more savings in price, treatment time, and wear resistance.

Unaffected by priority restrictions, Jetal replaces strategic materials and is available for immediate delivery in any quantity. No skill, elaborate equipment or electric current are required. Because of its unusual features, the process is a rousing keen interest throughout the defense industry. Samples and consultation service are offered by Alrose Chemical Co.

Priorities—A Challenge to the Chemist

NOW THAT finishing material manufacturers are having difficulties in obtaining raw materials, due to the defense program, it is up to their chemists to develop suitable materials or substitutes to replace the critical ones that are being used in defense work. I know the chemists in the research laboratories are busy doing this work which, no doubt, will bring out some good developments and discoveries for the benefit of both manufacturer and consumer.

It is true that the manufacturer who does not have many accounts, and who is doing work not connected with defense, and is unable to obtain raw materials which are affected by this program, absolutely must develop substitutes to stay in business.

I also believe that the rigid specifications the government submits for tests on these materials will benefit private manufacturers for application on their products after this shortage is over. Take, for instance, the finish on pontoons for naval aircraft. When a plane comes down on water, the force is so great that it will cut the enamel or finish off like a knife. However, finishes have been developed that will stand this test. This finish, for example, would be excellent for all types of speed boats or any marine craft.—HENRY NOVAK.

Compressed Air Control Catalog

A catalog describing a new line of industrial products for use in the control of compressed air has just been published by A. Schrader's Son of Brooklyn, N. Y. It is unique in the great number of new fittings and complete air-operated machine control sets it contains.

Reflected Beauty

When your product leaves your plant, it is a reflection of you, the manufacturer. Does it sparkle in appearance along with the originality, quality, and usefulness that you built into it . . . or does it look dull and commonplace?

If your product is on the dull, uninteresting side, we can be of service. Besides furnishing a finish that protects and preserves, our Creative Studio will also incorporate the beauty and attractiveness so vital to sales.

This service has been very helpful to many manufacturers . . . it has definitely stepped up the sales of many products. If you are interested in this service . . . free to reputable manufacturers . . . we will be glad to hear from you.

ROCKFORD VARNISH COMPANY

Manufacturers of Finishing Materials

ROCKFORD • ILLINOIS

NO TAMPERING WITH QUALITY

Fumed Finish

We have a large order for chairs, where the specifications call for fuming with ammonia gas. As we have never fumed chairs this way, we would appreciate it very much if you could give us this information by return mail.—S. M. Chair Co.

Fuming oak furniture with ammonia gas, to give it a certain color, is an old method used some 20 to 35 years ago. Complete information about it and the equipment used can be found in some of the old books on wood finishing, which are obtainable in libraries. It would be costly to use today, as the method does not lend itself to rapid production. The same surface effect is obtained now through the use of stains.—ED.

Wallboard Finish

We are interested in securing data which will acquaint us with the relative advantages and disadvantages and costs of different industrial finishes used in coating wallboard, both decorative and non-decorative. We understand that these finishes can be classified in three distinct groups, namely:

1) Polymerized synthetics, urea formaldehyde or glyptol types.
2) Nitrocellulose lacquer type.
3) Oil-base coating.

If you can supply us with any information on the above, or direct us to sources of such data, we would be very grateful.—N. E. Co.

We have no specific information on this subject at the present moment, but believe that a heat-cured synthetic finish would rank first in point of hardness, toughness and general durability. It would probably be more resistant to moisture, mild acid, alcohol and alkali solutions, and various abrasive action such as might be encountered in long hard service. Probably it would be the most expensive finish, too.

The lacquer type of coating dries quickly and it provides an attractive and fairly durable finish. It would cost the least insofar as time, labor and baking or heat curing are concerned, although the lacquer material itself might cost more than an oil-base coating.

An oil-base coating, to be practical in modern high-speed production, would probably need to be baked or heat cured, which would add to its hardness and general durability. Also, oil-base coatings will likely be more easy to secure during the Defense Emergency.—ED.

Questions; Answers

Questions are welcome and will be answered promptly by mail. Readers are invited to prepare and send in additional information relating to any of these questions and answers.

Level Gauge for Pressure Tanks

Will you please advise me as to where I can obtain a gauge that will tell me how much paint there is in a pressure tank, without removing the cover or stopping pro-

What kind of finish would you like to see?

BERRY BROTHERS HAS THEM ALL!

HAM-R-FORM . . . Non-metallic . . . one coat, two operations . . . quick-bake . . . economical . . . hides metal irregularities.

MULTIFORM . . . Non-metallic . . . two-color finish . . . one coat, two spray operations . . . one entry into booth . . . easiest of decorative finishes to apply . . . air-dry or bake . . . unlimited number of color combinations . . . very attractive and popular.

RUFKAST . . . Bake or air-dry . . . full range of pattern sizes . . . infrabake or conventional oven types . . . one coat hides metal defects.

ONE-COAT CRYSTAL . . . Readily available . . . crystal pattern . . . easy to clean . . . economical . . . lots of sparkle and eye appeal . . . requires direct-fired gas oven.

LIONOIL . . . If coated rust-resisting metals are not available, use steel and protect against rust with Lionoil.

RAVEN LINE BLACKS . . . low cost . . . easy application . . . no material shortages . . . rich, durable finish.

Write to Berry Brothers for industrial finishes for wood or metal.

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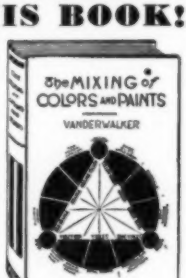

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INDUSTRIAL FINISHING
1142 N. Meridian St. Indianapolis, Ind.

duction on this tank? We have thought of using a water gauge, the same as used on a steam boiler, but seem to think that the glass tubing may become colored by the paint and we would not be able to tell how much paint is in the tank. If you have any ideas as to how this could be done we would appreciate it very much.—P. W. Co.

The two largest manufacturers and advertisers of spray equipment (both in I. F.) have pressure tanks equipped with reliable gauges that show how much material remains in the tank.

One company, to whom we referred your inquiry, writes as follows:

"For years our larger pressure-feed paint tanks have been available on special order and at a slight increase in price, equipped with a glass-level gauge. Lack of demand for this accessory has kept us from including it in our standard line of tanks.

"Another method of indicating material level within the tank is the King Seely Telegauge, which is illustrated and described on the back of our catalog sheet IC-102. This device, you will observe, is a mixing as well as a level gauge. It has been used only on tanks of large capacity and we have employed it only in connection with the mixing tanks of our paint-circulating systems. It is not, however, generally employed."

Quoting from a catalog sheet of the other company, we read:

"A clear vision gauge shows exact weight of lacquer and thinner added to the tanks. In this way any desired viscosity can be matched time after time. The gauge also serves as a 'Level Indicator' and besides the 'weight'

calibration, it is possible to read at a glance just how many gallons of liquid are in the tank."

One of these manufacturers lists a level gauge for 30 and 60-gal. tanks at $9.50.—Ed.

Coating Makes Glass Shatterproof

We understand there is a synthetic material on the market called "Garinol." This material can be sprayed or brushed onto glass and it is transparent. It air dries and will prevent glass from shattering after it is fractured. We would appreciate your advising us if you have any information concerning this product.—N. A. of P. A.

Editor's Note: This inquiry was published in the "Letters From Readers", in October 1941 issue. Upon reading it, Mr. Drendan Sullivan, Associate Editor of the magazine "Glass Digest", New York, N. Y., recognized "Garinol" as a material about which his magazine had published an article in February 1941 issue. Accordingly, he immediately wrote us to the effect that "Garinol" is a product that was developed and is now manufactured in England, and that it is now being introduced into this country by Mr. Edward J. Fay, 522 Fifth Ave., Suite 1117, New York, N. Y.

Quoting part of Mr. Sullivan's article:

"Long before 'lightning' war struck in England, one of that country's foremost pharmaceutical firms was experimenting with a chemical for protecting glass which is now proving valuable in protecting not only property, but persons from a major source of injury and death—flying fragments of jagged, raw-edged glass hurling through the air with bullet-like speed.

"The needs of peace, not war, motivated the development of the new

FORM - A - ROC

We offer to all industries equipped for baking finishes this highly perfected, heat-converting, synthetic enamel.

FORM - A - ROC

We have combined to an optimum degree the necessary qualities of tremendous hardness, great adhesion, smooth lustrous gloss, and freedom from haze, discoloration and wrinkling.

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Baking schedule is of great flexibility, permitting from 5 - 50 minutes at 250 - 375° F.

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No matter which of the present worthy finishes of this type you may be using or planning to use we sincerely recommend that you investigate

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MADE BY

THE VARNISH PRODUCTS CO.

5208 Harvard Avenue

CLEVELAND, O.

Announcing the new, fast **BAKESEAL KILNVAR** *Finishing System!*

● Here's Schaefer's answer to today's fast finishing needs — to meet the increasing scarcity of chemicals for lacquer production. A remarkable new finish—(1) BAKESEAL, a tough, full-bodied undercoat that provides a proper foundation for enduring finish—and (2) KILNVAR, a new varnish type finish of lasting depth, offered in Gloss Rubbing, Semi-Gloss or Flat effects. Both these materials are designed for conditioned dry room production to satisfy the demands for speed — or for air drying.

Get the complete story about this finish and arrange for a production test—direct or through our Schaefer representative in your district.

Ask your Schaefer Representative about this discovery!

THE SCHAEFER VARNISH CO., Inc.
Louisville, Kentucky

product. The developers were searching for a means of preventing the loss of expensive, hard-to-get pharmaceutical liquids due to breakage of their glass containers. The researchers' efforts resulted in the new product, which is called 'Garinol.' Its effectiveness was satisfactorily demonstrated last month to Glass Digest. Similarly satisfactory tests were made by various government agencies in England, including the Ministry of Home Defense, H. M. Navy, Vickers-Armstrong, etc., as well as various private groups, according to the developers. The producers also report that it is being used as a defense medium by the Admiralty and many other units of the English government and private agencies.

"The product is a transparent liquid applied with a brush to the surface of the glass. Two coats are usually necessary. Being practically colorless, it does not interfere with the transparency of the glass. It does not prevent the glass from breaking, but it does hold the broken pieces together so that splinters and fragments of sharp-edged glass do not scatter. Further, the cracked glass can be handled with safety as a synthetic bevel is formed.

"In the test at Glass Digest, an ordinary electric light bulb, a glass bottle (filled) and pieces of plate and sheet glass were used. The test showed that, besides holding the broken pieces together, the new product 'fortified' the glass, i.e., more force was required to break the glass than is ordinarily needed.

"Dropped from a height of seven feet onto a concrete surface, the bulb glass was cracked, but the broken pieces remained in place instead of scattering as they usually do. When dropped from the same height with the same propelling force, the bottle and plate glass remained unbroken but cracks showed. Both had to be thrown repeatedly and with increased force on each occasion before a break occurred, and the liquid failed to leak out of the bottle even when the bottom was shattered. The thin sheet cracked at six feet. With all four objects, it was possible to squeeze the broken pieces—held together by the liquid coating—in the hand without puncturing or scratching the skin.

"'Garinol' is non-inflammable and, as demonstrated in the tests made in England, is immune for a considerable period to the deteriorating effects of the weather and atmosphere. It has a high degree of extensibility and tensile strength. It adheres with remarkable firmness to the glass, yet is removable by special solvent.

"Although originally developed for the specific purpose of being used to

prevent loss of pharmaceuticals, the many possible uses of the new product both in war and peace were immediately apparent to the developers. It dries on the glass in from three to twenty-four hours. The glass remains unbroken under the stress of heavy shocks and, if broken, will stay in place in the sash without falling out or admitting the air or weather. Obscuration can be obtained by adding necessary dyes to the product.

"The number of ways in which the product will protect property have not yet been completely explored. In the case of displays, especially foods, its value is apparent in preventing loss of the foods.

"The devlopers report that 'Garinol' sells in England for about $7.20 a gallon, but if made in this country it would probably sell for even less. The reason is that virtually all the ingredients used in making the product come from this country."

Treatment for Spray Booth Floors

Rereading my file of INDUSTRIAL FINISHING, in a search for one thing, I ran across an item on the subject of "Spray Booth Floor Covering," in which the question of coating the floor with paraffin was mentioned.

Paraffin has been found to be a satisfactory "separation coating" on both concrete and wooden spray booth floors, where the lacquer used does not contain a solvent that dissolves paraffin. I have found, however, that the use of the kerosene-gasoline solvent leaves a coating that retains just enough of the solvent to make the floor slippery, and to render a man's footing insecure if the coating be applied thickly.

A chemist friend in a refinery, which turns out paraffin wax, suggests that a small amount of the solvent does not evaporate from the mixture, and that it therefore does not harden completely. On this hypothesis, the paraffin was dissolved with carbon tetrachloride, to a consistency where it

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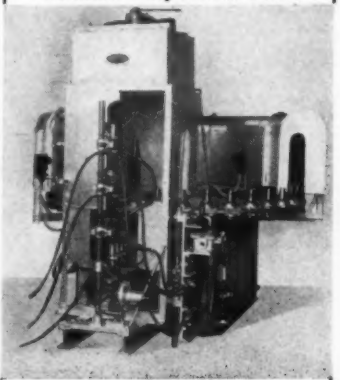
SPRAY EQUIPMENT



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For highest safety and lowest service cost, use the R-151 Chemical Respirator. Its chemical cartridge purifies fumes—extra filter prevents clogging. Thus, cartridge lasts longer, needs less replacement. Give your spray men the R-151 Respirator for safety, comfort, durability. Get prices.

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Industrial Spray Painting

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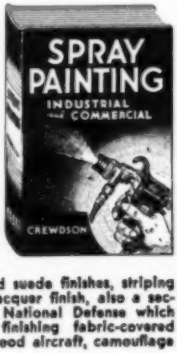

This new book covers the fundamental principles of spraying technique, together with the latest developments and practices of this craft. Covers common paint pigments, paint extenders, enamels, oil and spirit varnishes, shellac lacquer, synthetics, all types of modern air guns, spraying technique, spraying standard materials, spraying defects, their cause and remedy, flock and suede finishes, striping and lettering, pearl lacquer finish, also a section on spraying for National Defense which covers cantonments, finishing fabric-covered aircraft, finishing plywood aircraft, camouflage painting, etc.

INDUSTRIAL FINISHING

1142 N. Meridian St. Indianapolis, Ind.

would brush evenly, and then applied to both wooden and concrete floors. The solvent, in this case, evaporated cleanly and quickly, leaving the paraffin much harder and less slippery than that dissolved with gasoline or benzene. Incidentally, it was considered advisable to run the ventilating fans in the booths until the coating had set firmly.

Quite favorable results have also been obtained by using a well advertised commercial floor wax in concrete-floored booths. If this is given a firm base, as by cleaning the concrete thoroughly before applying the first coat, rubbing in carefully, and then spreading a second thin coat, it has been my experience that such a coating will last for several weeks, giving a surface from which spent lacquer may be easily scraped.

Returning again to the paraffined floor: Quite accidentally it was discovered that a warmed scraper is much more effective than a cold one. In fact, the nearer the scraper blade approaches the melting point of the paraffin (about 124°F.) the more effective the scraper is in effecting separation between lacquer and coating. Acting on this theory, ordinary electric soldering irons were used as scraper shanks, the scraper blade being brazed to the soldering tip. Rheostat control maintained the current at a point where overheating of the thin scraper blade did not occur.

If paraffin is used, it should not be heated by direct flame. The material tends to "scorch" easily, and under excessive heat it breaks down to a gummy material and does not again harden to form a satisfactory surface upon which to walk or work. It takes longer to dissolve paraffin in any solvent

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CHICAGO, ILL. **BOSTON, MASS.**

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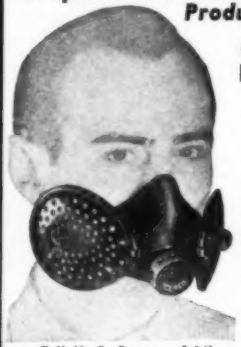

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★ Full U. S. Bureau of Mines Approval No. BM-2142 against Type A (Silica), Lead and Nuisance Dusts, PLUS a "lamb's-wool" feel, is gaining universal preference for this new Cesco No. 94 Respirator. Try it for better, faster finishing! Write

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That produce a clear, sharp print will enhance the quality of your work. Free from any design of their own, they reproduce your etched plate even in the minutest detail.

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Made in gloss or flat. Has nearly twice solid content of lacquer — same drying speed. Excellent adhesion to all surfaces. Eliminates bleeding. Flat makes excellent base for lacquer or other enamels. Can be tinted any color. Write for sample and information.

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706 East 19th St. Kansas City, Mo.

(carbon tetrachloride, for instance) at room temperature than at elevated temperatures, but I prefer to work under normal conditions, and shave or grate the paraffin to hasten its solution.

While on the subject of floor covering for booths, I noticed in a furniture factory, some months ago, that the booth floors were covered with linoleum. Inquiry brought out the fact that the cheapest grades of felt-base linoleum seconds were obtained from a plant in the same city, at the same price that was made to wholesalers. The linoleum was spread on the dry floor, after the floor had been thoroughly cleaned. These coverings are cleaned and waxed once a week. As a result the accumulated lacquer can be scraped off clean very easily.

In spray booths where the material is handled in and out on an overhead conveyor, and where the work does not rest on the floor during the finishing process, the linoleum stands up surprisingly well under the movement of the operator; also, it affords him a slightly resilient and sure surface on which to walk. By choosing a dark colored linoleum, the reflection of light from the floor is prevented, permitting closer control of spraying than can be obtained when the operator is annoyed by glare from below.—ELTON STERRETT.

Furniture Finishing

Mahogany on Birch

AN EXCELLENT finish can be obtained on birch through the following process:

1) Make the surfaces of the furniture smooth and clean by a thorough sanding. Other things being

equal, the finer and more uniform the sanding, the better the appearance of the final finish.

2) Take any good quality non-grain-raising stain; mix red, yellow, blue-black and stain reducer to the desired color and density of color. Spray on this mixture as evenly as possible with about 35-lbs. of air pressure, when using a gravity-feed system.

The spray gun should be held at least 15-in. from the furniture—sort of fogging on the stain. This is to prevent wetting the surface of the wood too much, which would raise the grain and also give a bad appearance.

3) Let the stained surfaces dry about one hour. Sometimes less drying time will do. Next, spray on a wash coat of clear lacquer sealer reduced about one part to two parts lacquer thinner.

4) Let this dry about two hours; then sand lightly all over with No. 5/0 or 6/0 abrasive paper.

5) Wipe and brush on a good quality of mahogany or walnut glazing stain. Do not wipe dry, but use a wide 4-in. paint brush to uniform the stain and remove all streaks.

6) Let dry overnight, preferably in a room at a temperature of about 100°F. Extra heat is not necessary in the wiping glaze, as it will dry at ordinary room temperatures, but some difficulty may be had in brushing fast-drying glazes.

7) Next day, rub the surfaces lightly all over with No. 3/0 steel-wool. This operation smooths the surfaces perfectly, removing any loose wood fibers or particles that may have been left by the stain or wiping cloths. Some finishers omit this operation.

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« *wax free* REMOVER »

for paint, varnish, lacquer, baked enamel, cement, etc.

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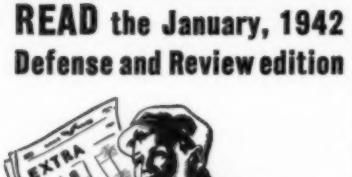


All the latest news on defense and non-defense

FINISHES

The latest finishes for the conditioning, surface preservation, decorating and polishing of products made of wood, metal and various compositions will be reviewed as a special feature of this issue. Every user of materials, supplies and equipment having to do with production-finishing, especially in connection with both defense and non-defense activities, should get a copy of this edition. It will have lasting as well as immediate value.

OUT JANUARY 18TH

Industrial FINISHING

8) Place in spray booth and blow off with extra air gun (not the spray gun) all loose particles of steelwool, dust and dirt. Give it a full coat of a good quality lacquer sealer. Let this dry at least one hour; then sand lightly all flat surfaces with No. 5/0 or 6/0 sandpaper.

9) Then apply a coat of good quality lacquer.

10) Let this dry overnight; then rub and wax.

Most any of the shades of mahogany or walnut, in the medium to dark colors, can be obtained.—F. F.

Frolics in the Finishing Room—8

BUCK, THE striper's helper had a hobby from which he derived much interest and amusement, but it proved very annoying to the finishing and cabinet departments. He was forever bringing in cigar boxes and different knickknacks to be sprayed.

Shortly before the incident I have in mind, Buck acquired a new "flame". He succeeded in working one of the cabinet-makers to make a glove box for her. Then he brought it to be sprayed. I said, "okay."

Through the course of the day's work, I had found that by taking a thick pigment from the bottom of a lacquer can and thinning it out for spraying, it would, in the course of drying, develop a cracked finish which looked like sun-dried mud.

I told the sprayer to put on a coat of white and I would fix up something for the final coat. Over the white coat we sprayed on a good thick coat of black. I told the sprayer to get rid of it as soon as it had been sprayed, as it would be "hot". Accordingly, re promptly took it to Buck who put it away immediately.

At lunch time Buck took out the painted glove box to stripe. Something very disappointing had happened. He came over to find out what had caused his pretty painted box to go that way. No one knew anything — although things were said that are unprintable. Buck never found out what caused the crackle finish; in fact no one knew but myself. He never brought in anything more to be sprayed.— J. K. COOPER.

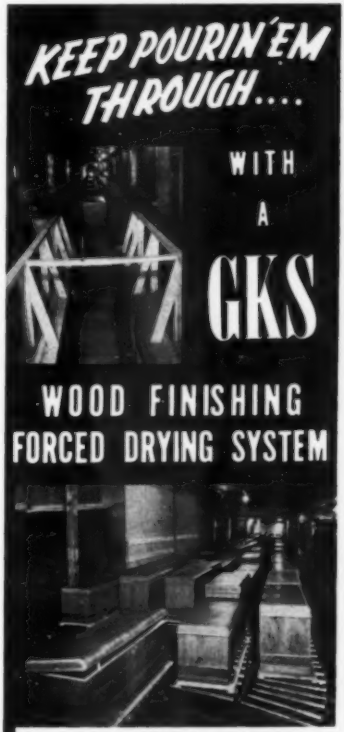
Letters from I. F. Readers

(Continued from page 8)

over 60-in., which is well spread over the year. We are not subject to heavy deluges, with a consequence that the atmosphere is definitely moist, the humidity content averaging, we should say, 80%. Even in the best weather, very rarely are lacquer manufacturers' estimated drying times attained.

The writer has recently been introduced to your trade journal, and has taken out a subscription with the New Zealand Agents. Fortunately, he has been able to secure about 20 of your old copies, and the types of equipment we think might be most useful are either:

1) That illustrated in your February 1940 edition, on page 54 . . . under the



A complete finishing system . . . spray booths, dryers with humidity control, conveyors, etc. . . . is designed, built and installed by GKS engineers to fit your exact requirements.

While priorities are causing a shortage of lacquer solvents, a GKS Forced Drying System enables you to secure satisfactory production using varnish sealers and finishing coats—and to switch back to former materials at any time, should you so desire.

Details? Phone, wire or write.

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By Ray C. Martin

The author takes up the raw materials that enter into the manufacture of these important finishes and includes laboratory formulations and testing, manufacturing methods, requirements of many types of finishes for various industries and products, methods of analysis, methods of applying finishing materials, chapters on furniture finishing and automotive finishing, a glossary of terms used in the industry with clear explanations of what they mean, and an alphabetical index of subjects covered in the book. Price $5.50 postpaid; cash with order.

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designation of "Rotary DC2, incorporating infra-red ray drying".

2) That illustrated in your February 1941 edition, on page 5, known as "No. R-200 Speedip Enameler".

The manufacturer of the "Rotary DC2" has an agent in New Zealand, so we have contacted him and written direct to the company, asking them for particulars about their machine, but that, of course, is essentially spraying.

To the best of our knowledge the manufacturer of the Speedip Enameler is not represented in New Zealand. We know nothing of their machine, though it appears to be particularly suitable for our small articles, such as nailbrush backs and toys—although as to whether it could handle the larger articles, such as hairbrush backs, we can not tell.

Can you help us by advising as to whether spraying, dipping, or even perhaps tumbling, would be most suitable for our work and, if so, could you put us in touch with suppliers of the necessary equipment?

The samples being sent to you under separate cover, by surface mail, comprise:

1) Nailbrush back, from sander, ready for finishing. The wood is New Zealand Southland beech.

2) Nailbrush back, as at present finished.

Details of coats:

A) One coat of No. 645 nitrocellulose white wood undercoat.

B) Bottom—one coat of No. 508 industrial lacquer.

C) Top and sides—two coats of industrial lacquer.

D) Mix of industrial lacquer is 60% lacquer to 40% thinner, approximately. From practical experience, proportions vary with different colors.

In conveying our inquiry to any equipment manufacturers, we think it important that they be advised of the limitations of the supply of lacquers in this country. Under the present existing circumstances of trade, lacquers can not be imported from overseas.

As previously stated, the most reliable manufacturers in New Zealand are Messrs. British Australian Lead Manufacturers (N. Z.) Ltd., who have only recently started producing lacquers in the Dominion. At the moment, they are producing Industrial Spraying and Dipping Duco, and Industrial Spraying and Dipping Dulux.

They are not producing any special lacquer for tumbling, but have assured us of their cooperation provided we get some guidance from any equipment suppliers as to the recommended types of lacquer to be used. Their reason for not producing this kind of lacquer is that there is no plant in the Dominion using it to any great extent.

New Zealand has only during the last three or four years, really started

to extend her manufacturing, particularly in those articles requiring industrial finishing. We ask if you, as an authority in this field, could help us who work in this small British Dominion in the South Pacific.

Any information you can send us in regard to synthetic enamel finishes, which may decrease the number of coats, handling operations, or give us superior finishes and enable us to establish an up-to-date plant, then such information would be of inestimable value, and most gratefully received.—J. Y. & Co., Ltd., Aukland, N. Z.

Appreciated I. F.

My father, James W. Smith, Jamestown, N. Y., died on August 10, 1941, and I am writing to ask that his name be taken from your mailing list. At the time of his death he was finishing foreman at the Jamestown Lounge Co. Many furniture men will remember Jimmy as finishing foreman of the Bailey Table Co.

Among his personal books were found filed copies of INDUSTRIAL FINISHING for many years back. I'm sure he read and enjoyed your magazine, and I wish you success and good luck, as Dad would have done.—Norman W. Smith.

Paint Mixing Units

Will you please give us a listing of manufacturers of paint-mixing units? We are mainly interested in units of design and type applicable to portable mixing operations. The sizes we require are for 5-gal., 10-gal., 20-gal., 30-gal., and 60-gal. containers. We would appreciate receiving this information at your earliest convenience.—S. Machinery Corp.

Masks for Fumes

We are interested in securing a mask suitable to protect workmen from fumes in our dipping department. In this particular department we are using an acetone solvent and despite all ventilation contrivances, we have not as yet eliminated 100% of these fumes from this particular department.

We would like to supply each operator with a mask that would neutralize these fumes. Can you suggest some source of supply where these masks can be purchased?—W. K. (Sporting Goods).

Information supplied.—ED.

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Industrial FINISHING

Distributed monthly to finishing room and paint shop foremen, production superintendents and company officials of metalworking, woodworking and miscellaneous industrial plants where production finishing is a major operation in parts and products manufacture.

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Published the 18th of each month by
PRACTICAL PUBLICATIONS, Inc.
1142 N. Meridian St., Indianapolis, Ind.
Telephone.....Riley 6771

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President.....A. T. Gaumer
Vice Pres. and Editor.....W. H. Rohr
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Subscription Rates Per Year
U. S. and Possessions.....$2.00
Canada and Foreign Countries.....$3.00
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Editorial

Corrosion-Resistant, Heat-Resistant Coatings

Under present conditions, with an increasing scarcity of certain materials and higher prices on those that are available, there is a strong incentive to preserve in good condition all serviceable articles made of metal, wood, fiber, etc. We see a reversal of the once widely wasteful practice of neglecting to do any maintenance painting on many articles and then discarding them for new ones, because new products to replace them could be obtained so easily, quickly and cheaply.

The useful life of most serviceable articles can be extended indefinitely if reasonable care and attention are given to preserve their surfaces. Here is where protective coatings and preservative treatments enter the picture to serve an important purpose. Coatings are available which impregnate and seal porous surfaces such as wood, fiber and composition. Some of these materials have the added merit of increasing the fire resistance of the surfaces to which they are applied.

For metals a wide variety of preservative coatings are on the market. These include clear and pigmented materials for use on rusty iron and steel to prevent the destructive action of rust from continuing to cause disintegration of the metal. The rust-preservative coating serves as an excellent prime coat for other paints that may be preferred for protective or decorative top coats.

Obviously the time is at hand when all manufacturers should not only become familiar with these various protective and preservative coatings but they should obtain a supply of them and see that they are properly used. They can be employed in both maintenance and production finishing.

* * * INDUSTRIAL FINISHING wishes all of its friends a Merry Christmas and a very Happy Prosperous New Year

Finish Material Problems—As per Present Conditions

The following letter, from one of our friends in the industry, presents some timely comments and suggestive thoughts which, we believe, will interest all users of production finishing materials.

* No one can predict what the immediate future will bring in the way of something new to take the place of material that is now unobtainable. Paint manufacturers are going through trying times as well as manufacturers of furniture and other civilian products.

It is not pleasant to have to ask our customers to replace lacquer finishes with varnish, or to tell them we can no longer supply them with thinner and sealer, or advise them to use lacquer only on products that must be finished that way—so that we can ration our present supply out a little farther. Also, it isn't to our liking to hear them declare that they can get lacquer from some competitive company. It is true that some few companies are out after new accounts and are selling lacquer to a large account by taking it away from some of their smaller ones, but under present conditions this practice will not last.

Some paint manufacturers did happen to have a large supply of lacquer solvents on hand and, with the little they will get from time to time, they will be able to supply some of their accounts with lacquers and thinners. But since nitrocellulose cotton and scrap film are being rationed out, they may soon find that they have the solvents but no cotton or scrap film. That is why I would urge certain users to make the change now while they can do it slowly without interrupting production. When buying some of the lacquer material that may be offered for sale, I would advise users to investigate first.

We may all differ in our ideas as to the future and what can be expected, so we should all do what we can to facilitate our government's armament program. This program has imposed difficulties and hardships on manufacturers of a wide variety of civilian products, many of which are very much in demand. This has brought several new problems to light. Paint manufacturers have been caught short and off balance, just as the furniture manufacturer was when he was told that he would not be able to get lacquer thinners and sealers in large quantities, and perhaps none at all.

The paint manufacturer didn't think he would be unable to get lacquer solvents such as butyl acetate, ethyl acetate and alcohol —some of the most important solvents that go into the making of lacquers. We may be unable to get alcohol with which to cut shellacs, for the duration of the emergency, because a large part of the equipment for making methanol alcohol has been transferred over to making ammonia for National Defense materials. Manufacturers of alcohol are adding new equipment for increasing production but, even so, it will be a long time (under present conditions) before relief can be expected in the way of having raw materials for lacquers.

We can be thankful that there

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* Guest Editorial . . . Many readers can write an excellent editorial—two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.

are other raw materials that will keep the furniture factories and paint factories going. The technical staffs in all of the paint industries are busy trying to replace or find satisfactory substitutes for lacquers and synthetics. They invite the cooperation of their customers to bear with them until something can be worked out. If every furniture manufacturer will stand by and cooperate with his supply house, I am sure that the finish manufacturer will work out some suitable finish for him. The paint makers' technical staffs have never failed to come up with something in the way of a finish that could be used effectively and economically.

The paint manufacturer has many things he can fall back on—if he can get his customers to use them. He can go back to the formulas of 1915 and other years, and rework them to the best of his ability and improve on them wherever improvement can be made. At the same time, he can be on the lookout for anything new that might come his way. With such modern drying ovens and infra-red lights, resourceful manufacturers should be able to keep production going with the present-day varnishes.

I do not think that furniture manufacturers will have much to worry about, because there will be an ample supply of wood for them and for the National Defense needs. In fact, I think the future is rather bright for manufacturers of furniture and finishing materials.

As defense production gathers moment, more steel will be needed. This will diminish or limit the output of numerous household appliances and other products made of metal. When Mr. and Mrs. John Q. Public can't buy metal appliances, they will spend their money for many things made of wood which will be finished with paints and varnishes — some perhaps coated with a low-baked finish formulated with a butyl resin. Mr. Public doesn't particularly care whether his table or chair is finished with lacquer or varnish; he seldom asks specifically what kind of finish was used—and even if he did, the furniture salesman might not be able to give an accurate or truthful answer.

This all adds up to one thing: If we are to keep up the high morale of our people in this country, civilian needs must and will be taken care of. In order to do this we must all cooperate in this emergency. The furniture manufacturer and paint manufacturer must be preserved, because it is very essential to the industrial growth of America. We will have to bear in mind, while going through this change: "How are we going to be setting when hostilities cease?" We should be ready to keep right on going.

In the coming year more and more furniture is going to be bought. Many homes will be redecorated and the demand for new style finishes and paints will be greater. One of my friends said to me, "Now that people will not be allowed to build so many new homes, less paint and new furniture will be needed." I told him that I didn't agree with him; that I thought it would be just the reverse. Most people will have more money to spend and will redecorate their old homes and also buy the new furniture they have been wanting for so long. Some people are just beginning to spend money for their homes because they are now getting back on their feet from the lean years of late.

The demand is here, and there is no shortage of lumber or raw materials for varnishes. There are plenty of raw materials for varnishes made from dammar and other copal gums, such as Manila, Batu and East India gums. Shipping difficulties on these seem to be less acute than was thought. Then there is Congo gum, which is likely to be plentiful.

There is some relief in store for small enterprises, as I believe the OPM is going to try to relax its priorities and allocations to a limited extent in order to keep more people on the job. Otherwise many concerns would be in danger of being put out of business unless the OPM allows them to get raw materials. But remember, I said "trying."

One must remember back about six months ago when it was said that plastics would take the place of metal on various things. But look now; even lead is threatened with an imposition of full priority. One of our customers came near to closing because he could no longer get shredded newspaper with which to pack his products.

I heard of a friend going around saying, "There is no shortage of anything," and that, "a lot of this is the bunk," but I notice he has stocked up and made some changes. I do not agree with him that there is no shortage, but the tremendous demand for raw materials by the government is such that there is not enough production available now to keep up with the civilian demands which have increased too.

In closing, I would like to say that if you can make a change to any one of the varnishes now, you may not be one of those who later will be "left out on a limb."—RUSSELL DAVIS.

Furniture Manufacturing to Be Allowed to Continue—OPM

An optimistic note was sounded when Dr. James F. Bogardus, price administrator for the Office of Price Administration said, in a talk before furniture manufacturers attending the American Furniture Mart early last month, that the furniture industry is fortunately situated in the national emergency picture.

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ROSELLE PARK, N. J.

December 2, 1941

AIR MAIL

Mr. E. A. Dosch
Industrial Finishing
1142 N. Meridian Street
Indianapolis, Indiana

Dear Mr. Dosch:

You will be interested to learn that our page advertisement in your November issue has flooded us with inquiries from all parts of the country. The response has been very gratifying and quite remarkable.

PEARL ESSENCE to produce aluminum, bronze, or gun metal finishes. Our November advertisement suggested using MEARLMAID A number of manufacturers who wrote us in reply to our "ad" stated that they were looking for a good substitute for chrome plating which will be largely restricted in its use after the first of the year.

The replies we received, Mr. Dosch, not only prove th INDUSTRIAL FINISHING enjoys an unusual readership, but also that is a widespread interest in finding substitutes for aluminum fi and chrome plating.

We know that MEARLMAID PEARL ESSENCE will solve t problem for many manufacturers.

Sincerely yours,

THE MEARL COR

H. E. Mett

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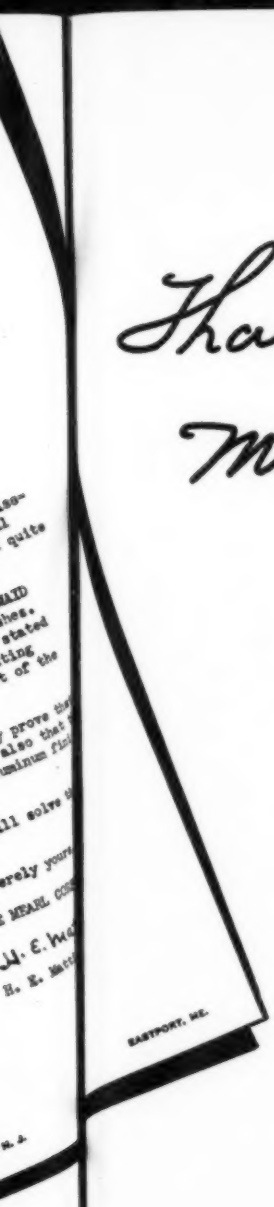

Thank you,
Mr. Mattin!

—Doach

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slightly, as compared with many other industries, with defense requirements," he pointed out. "You provide employment for a great many people, with small consumption of metals and other supplies needed for rearmament. The attitude at Washington definitely is that the furniture industry should be permitted to continue production with as little curtailment as possible."

On that note, plans are being carried forward for what is expected to be the largest winter market ever held at the American Furniture Mart.

Lines have been cut down considerably in order to speed production on more popular numbers and few new suites were shown at the market. Modern and functional traditional furniture were the highlights, with limed oak, cherry, maple, walnut and mahogany the most popular woods. Painted furniture, styled after the old Pennsylvania Dutch, was a quaint feature carrying out the American trend. Many new fabrics were seen exemplifying the Hawaiian, Chinese and South American influence.

Correction on R. H. Wampler's Article in November

Referring to November, 1941, issue, page 21, in Mr. Rollin H. Wampler's excellent article entitled, "How Material Scarcity May Affect New Furniture Finishing", please note the last paragraph on page 21, under the heading, "Wash Coats; Sealer Coats". The first sentence in this paragraph should read:

"Pure white shellac reduced with

alcohol, and lacquer sealer reduced with lacquer reducer have been universally used as wash coats."

The first sentence in the following paragraph, near the top of page 22, should read:

"Lacquer sealer has been widely used as a sealing and building coat, as well as smaller quantities of shellac and shellac substitutes."

These corrections were written on our galley proofs, but the compositor switched the words to be inserted and this error was not discovered at the final proof-reading. If you have a November issue please write in these corrections. —EDITOR.

Basic Patent on Melamine Resins

After an extended priority controversy in the Patent Office involving the Ciba Products Corp. and American Cyanamid, Monsanto Chemical Co. was finally awarded the basic patent on melamine resins. The patent, number 2,260,239 was issued on October 21, 1941.

Inasmuch as important subsidiary patents relating to the melamine resins field have been granted in this country to Cyanamid, as well as Ciba Interests, arrangements have been concluded whereby licenses granted by the owners of these subsidiary patents will include rights to operate under the basic Monsanto patent. During the past three years a great deal of interest has been aroused in plastics and coating compositions made from melamine resins and the general use of this new class of resin products has expanded rapidly.

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We have just received the November copy of Industrial Finishing and as usual have read it from cover to cover.

We would like to purchase reprints of the article starting on pages 12-13, entitled, "Industrial Finishes for Non-Defense Orders" and "How Material Scarcity May Affect New Furniture Finishing," which begins on page 21.

We feel that both articles are so important that we would like to have these reprints for a few of our more important customers . . . . .

—The Marietta Paint & Color Co.

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To our many friends, and to all readers of

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